ADDITIONAL NOTES ON THE GENUS VERBENA. XVII

Harold N. Moldenke

VERBENA [Dorst.] L.

Additional & emended bibliography: Leverett, New Cop. Lex. Latin Lang., new ed., 373, 508, 643, & 947—948. 1852; Holland, Moth Book, pr. 1, 163. 1903; Almagia in Pirotta, Fl. Col. Erit. 1: [Ann. Inst. Bot. Roma 8:] 130. 1903; Métraux, Bishop Mus. Bull. 160: 342. 1940; Reitz, Sellowia 6: 254. 1954; Rambo, Sellowia 6: 60, 84, 153, & 165 (1954), 7: 260, 266, & 288 (1956), and 9: 158. 1958; Lind & Tallantire, Some Com. Flow. Pl. Uganda 145. 1962; W. G. Wright, Wild Fls. South. Afr. 156—158. 1963; Holland, Moth Book, pr. 2, 163. 1968; Reitz, Sellowia 22: 145. 1970; Dwyer, Raymondiana 4: 71. 1971; Moldenke, Biol. Abstr. 52: 1316 & 9948 (1971) and 53: 5798. 1972; Zepernick, Baessl.-Arch., new ser., 8: 124, 132, 133, 159, 219, 224, 225, 246, 271, 273, 277, 282, & 306. 1972; Anon., Biol. Abstr. 53 (11): B.A.S.I.C. S.266. 1972; Montz, Castanea 37: 143. 1972; Moldenke, Phytologia 24: 20—54 & 126—150. 1972; Gillett, Tweedie, & Fulton, Guide Some E. Afr. Upland Fls. [14], fig. 1. s.d.

Holland (1903) states that the moth, Catabena lineolata Walker, feeds on Verbena while in the larval stage. Métraux (1940) notes that a species of Verbena is used on Easter Island for skin and sexual organ diseases. It is an introduced species known as "puringa". I assume that he refers to V. litoralis H.B.K., since that is the only species of the genus known to me from the island.

VERBENA ABRAMSI Moldenke

Additional bibliography: Moldenke, Phytologia 23: 213 & 286. 1972.

Additional citations: CULTIVATED: California: Moldenke & Moldenke 25709 (Ld).

VERBENA BONARIENSIS L.

Additional bibliography: Neal in Handy, Pukui, & Livermore, Bishop Mus. Bull. 126: 41. 1934; Parham, Pl. Fiji Isls. 216. 1964; Reitz, Sellowia 22: 145. 1970; Moldenke, Phytologia 24: 20—21, 29, & 130. 1972; Zepernick, Baessl.-Arch., new ser., 8: 132, 219, 246, 273, 277, 282, & 306. 1972; Gillett, Tweedie, & Fulton, Guide Some E. Afr. Upland Fls. [14], fig. 1. s.d.

Additional illustrations: Gillett, Tweedie, & Fulton, Guide Some E. Afr. Upland Fls. [14], fig. 1 (in color). s.d.

Gillett and his associates, in the undated booklet cited above, describes this plant as "A much branching plant originally from South America, growing to about 3'6", and often found in large patches near buildings." Additional vernacular names recorded for it are "ha'uoi" in Hawaii, "titania" on Rapa island, and "vunikuta" in the Fiji Islands.

Additional citations: CALIFORNIA: Merced Co.: Moldenke & Moldenke 25749 (Ac, Ld).

VERBENA BRASILIENSIS Vell.

Additional bibliography: W. G. Wright, Wild Fls. South. Afr. 156 & 157. 1963; Reitz, Sellowia 22: 145. 1970; Moldenke, Phytologia 24: 21. 1972; Montz, Castanea 37: 143. 1972.

Additional illustrations: W. G. Wright, Wild Fls. South. Afr. 157 [as V. officinalis]. 1963.

The so-called "Verbena officinalis" of Wright (1963) is actually V. brasiliensis Vell., at least insofar as she has illustrated it. She says that the plant [which one?] "is used by the Sotho people for treatment of fever, anaemia, dropsy and pleurisy," gives the flower color as "mauve", and records the vernacular Sotho name "seona-se-seholo", as well as "vervain" and "wild verbena". Irwin and his associates found V. brasiliensis growing at 1650 meters altitude in "cerrado and gallery forest with some campo" in Brazil. The corolla is described as "violet" on Irwin, Harley, & Onishi 29512. Montz (1972) records the species from "East St. Charles Parish", Louisiana.

Additional citations: BRAZIL: Minas Gerais: Irwin, Harley, & Onishi 29512 (Rf).

VERBENA CALIFORNICA Moldenke

Additional bibliography: Moldenke, Phytologia 23: 218. 1972.

Additional citations: CALIFORNIA: Tuolumne Co.: Moldenke & Moldenke 25758 (Ac, Ld, Ws).

VERBENA DISSECTA Willd.

Additional & emended bibliography: Schnack & Covas, Darwiniana 7: [71] & 73. 1945; Reitz, Sellowia 22: 145. 1970; Moldenke, Phytologia 23: 260, 283, & 431. 1972.

VERBENA FLAVA Gill. & Hook.

Additional & emended bibliography: Schnack & Covas, Darwiniana 7: [71], 72, 74, & 75, pl. 4 C ["G"]. 1945; Moldenke, Phytologia 23: 260 & 426. 1972.

Emended illustrations: Schnack & Covas, Darwiniana 7: pl. 4 C ["G"]. 1945.

VERBENA GRACILESCENS (Cham.) Herter

Additional synonymy: Verbena glabrescens (Cham.) Herter ex Moldenke, Phytologia 23: 436, sphalm. 1972.

Additional bibliography: Moldenke, Phytologia 23: 261 & 436. 1972; A. L. Moldenke, Phytologia 23: 318. 1972.

The corollas are described as having been "bluish-white" on the Tressens et al. collection cited below.

Additional citations: ARGENTINA: Corrientes: Tressens, Benítez, Bissio, Cristóbal, Fernández, Mroginski, Pire, & Pueyo 230 (Rf).

VERBENA HUMIFUSA Cham.

Additional bibliography: Rambo, Sellowia 9: 158. 1958; Reitz, Sellowia 22: 145. 1970; Moldenke, Phytologia 23: 271. 1972.

xVERBENA HYBRIDA Voss

Additional bibliography: Moldenke, Phytologia 24: 22, 39, & 42. 1972.

In July and August, 1972, my wife and I observed this plant in outdoor cultivation in several localities in Uganda, Kenya, and Tanzania (Tanganyika).

VERBENA INCISA Hook.

Additional bibliography: Moldenke, Phytologia 23: 369 (1972) and 24: 37 & 140. 1972.

The corollas are described as having been "red" on both of the collections cited below.

Additional citations: ARGENTINA: Corrientes: Schinini & Mroginski 4449 (Rf); Tressens, Benítez, Bissio, Cristóbal, Fernández, Mroginski, Pire, & Pueyo 135 (Ac).

VERBENA LASIOSTACHYS var. SEPTENTRIONALIS Moldenke

Additional bibliography: Moldenke, Phytologia 23: 286 & 287. 1972.

Additional citations: CALIFORNIA: Santa Cruz Co.: Moldenke & Moldenke 25971 (Ld).

VERBENA LITORALIS H.B.K.

Additional bibliography: Métraux, Bishop Mus. Bull. 160: 342. 1940; Reitz, Sellowia 22: 145. 1970; Moldenke, Phytologia 23: 369, 371, 415, & 419 (1972) and 24: 30, 31, & 126. 1972; Zepernick, Baessl.-Arch., new ser., 8: 133, 159, & 271. 1972.

Métraux (1940) notes that on Easter Island a species of Verbena, called "puringa", is used to treat skin diseases and diseases of the sex organs. Verbena litoralis is the only species of the genus known to me from the island, so I am assuming that it is to this plant that he refers. Irwin and his associates describe V. litoralis as a "slender herb to 1 m. tall", with lilac corollas, growing in secondary forests on lower slopes with numerous rock outcrops.

Additional citations: BRAZIL: Minas Gerais: Irwin, Harley, & Onishi 28721 (Rf).

VERBENA MICROPHYLLA H.B.K.

Additional bibliography: Moldenke, Phytologia 23: 370, 426, & 431 (1972) and 24: 22. 1972.

The Herrera 3450, cited below, was originally distributed as V. laciniata (L.) Briq. and later erroneously cited by me as V. temisecta Briq.

Additional citations: PERU: Cuzco: Herrera 3450 (N).

VERBENA OFFICINALIS L.

Additional bibliography: Almagia in Pirotta, Fl. Col. Erit. 1: [Ann. Inst. Bot. Roma 8:] 130. 1903; W. G. Wright, Wild Fls. South. Afr. 156 & 157. 1963; Moldenke, Phytologia 24: 20, 22—27, & 31. 1972.

Miss Wright's (1963) explanation of the Celtic "ferfaen" [supposed source of the name "Verbena"] as meaning to drive away stones "as the plant was used to expel gravel" is a rather curious way to describe the medicinal use of the plant in the treatment of gall-stones and bladder-stones! The illustration given by her and labeled as V. officinalis actually depicts V. brasiliensis Vell. instead! She says that "the plant is used by the Sotho people for treatment of fever, anaemia, dropsy and pleurisy", but it is not clear if she is referring here to the true V. officinalis or to V. brasiliensis, or both.

Almagia (1903) cites the following collections from Eritrea: Pappi 212, 393, 847, 973, 984, 1032, 1551, 1862, & 2168, Terracciano & Pappi 3580, 3654, 3879, 4213, 4274, & 4344, and Ragazzi 89, as well as Schimper 145 and Schweinfurth 1116.

Additional citations: EIRE: J. Butler 351 (N).

VERBENA PULCHELLA Sweet

Additional bibliography: Moldenke, Phytologia 24: 36, 38, 46—49, 137, 138, & 141. 1972.

The Krapovickas, Fernández, Mroginski, Bissio, & Quarin 19932, distributed as V. pulchella, is actually V. temisecta Briq.

VERBENA RIGIDA Spreng.

Additional bibliography: Reitz, Sellowia 22: 145. 1970; Moldenke, Phytologia 24: 128—133. 1972; C. D. Adams, Flow. Pl. Jam. 627, 628, & 848. 1972.

Additional illustrations: Batten & Bokelmann, Wild Fls. East. Cape Prov. pl. 99 (9) [in color]. 1966.

Adams (1972) describes this plant as a "Cultivated ornamental escaping occasionally.....on roadsides and in rough pastures; 2000—3500 ft; fl. and fr. May—Sept.", cites Adams 11205, Harris 11969, Proctor 23557, and comments "Native of subtropical S. Amer., introduced into Bermuda, United States, Cuba and elsewhere".

Batten & Bokelmann (1966) call it a "Slender perennial, growing in groups, occasionally in grasslands and along roadsides throughout the country [South Africa]. Escape from cultivation", flowering from October to March.

A letter written by T. S. Cochrane on July 19, 1972, informs me that in the herbarium of the University of Wisconsin there are the following specimens of this species not as yet seen by me: SOUTH CAROLINA: Richland Co.: Logue 976. ALABAMA: Tuscaloosa Co.: Deramus 571. MISSISSIPPI: Hancock Co.: F. H. Sargent 8356. LOUISIANA: Ascension Par.: Sauer 3984. TEXAS: Harris Co.: G. L. Fisher s.n. [14 Sept. 1913] (2 sheets).

The Krapovickas, Cristóbal, Arbo, Benítez, Maruñak, Maruñak,

Pire, & Tressens 18226, distributed as typical V. rigida, is actually V. rigida var. obovata (Hayek) Moldenke.

VERBENA RIGIDA var. OBOVATA (Hayek) Moldenke

Additional bibliography: Moldenke, Phytologia 24: 131—133. 1972.

The color of the corollas on the Krapovickas et al. collection cited below is said to have been "purple".

Additional citations: ARGENTINA: Corrientes: Krapovickas, Cristóbal, Arbo, Benítez, Marufiak, Marufiak, Pire, & Tressens 18226 (Rf).

VERBENA SCABRA Vahl

Additional bibliography: Moldenke, Phytologia 24: 138—140 & 146. 1972.

Liogier describes this plant as a much-branched herb and found it growing in open places along streams. He describes the corollas as having been "violet" in color.

Additional citations: HISPANIOLA: Dominican Republic: Liogier 18486 (N).

VERBENA STRICTA Vent.

Additional bibliography: Britton & Br., Illustr. Fl., ed. 2, pr. 5, 3: 94—96, fig. 3556. 1970; Domville & Dunbar, John Burroughs Nat. Hist. Soc. Bull. 8: 94. 1970; El-Gazzar & Wats., New Phytol. 69: 483 & 485. 1970; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1877. 1970; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1315 & 1319—1320. 1970; Reed & Hughes, U. S. Dept. Agr. Agric. Handb. 366: [Common Weeds U. S., pr. 1] 308—309, fig. 152. 1970; Brown & Wherry, Bartonia 40: 13. 1971; Cochrane, W. E. & M. M. Rice, Mich. Bot. 10: 184. 1971; J. L. M., Weed Abstr. 20: 321. 1971; Ownbey & Monserud, Common Wild Fls. Minn. 313. 1971; Reed & Hughes, Common Weeds U. S., pr. 2, 308—309, fig. 152. 1971; Thilenius, U. S. Dept. Agr. Forest Serv. Res. Paper RM.71: 42. 1971; Moldenke, Fifth Summ. 1: 14—20, 22, 23, 27, 32, 34—36, 38—42, 44, 46, 47, 50—53, 60, 62—64, 77, & 372 (1971) and 2: 649, 656, 665, 669, 672—674, 684, 692—695, 697, 698, 705, 708, 920, & 967. 1971; Moldenke, Phytologia 22: 485 (1971) and 23: 196, 221, 237, & 265. 1972; A. L. Moldenke, Phytologia 23: 317, 413, & 414 (1972) and 24: 131, 135, 136, 145, & 149—150. 1972; W. A. Weber, Rocky Mtn. Fl. 306. 1972.

Additional & emended illustrations: Britton & Br., Illustr. Fl., ed. 1, 3: 71, fig. 3061 (1898) and ed. 2, pr. 1, 3: 96, fig. 3556. 1913; Pammel & King, Iowa Geol. Surv. Bull. 4 (rev.): 269 & 270, fig. 153 & 153A. 1926; Pellett, Nat. Mag. 18: 185. 1931; Britton & Br., Illustr. Fl., ed. 2, pr. 2, 3: 96, fig. 3556. 1936; Noack, Biol. Zentralbl. 57: 386, fig. 7. 1937; F. H. & H. H. Hillman, Seed Trade Buyers Guide 1938: 137, pl. 12, fig. 7. 1938; Harvey, Erickson, & Larson, Seed Trade Buyers Guide 1945: 86. 1945; Martin & Barkley, Seed Ident. Man. 37, pl. 236. 1961;

Peterson & McKenny, Field Guide Wildfls. [287]. 1968; Rickett, Wild Fls. U. S. 3 (2): [363], pl. 110 (in color). 1969; Britton & Br., Illustr. Fl., ed. 2, pr. 5, 3: 96, fig. 3556. 1970; Reed & Hughes, U. S. Dept. Agr. Agric. Handb. 366: [Common Weeds U. S., pr. 1] 309, fig. 152. 1970; Ownbey & Monserud, Common Wild Fls. Minn. 313. 1971; Reed & Hughes, Common Weeds U. S., pr. 2, 309, fig. 152. 1971.

Recent collectors have encountered this plant at watertable tanks, in sandy soils along rivers, and (in Wheeler County, Texas) in limestone soil of a Salix community. An additional vernacular name recorded for it is "verbain". Weaver (1968) describes the plant as follows: it "is a characteristic weed of nearly all medium- or low-grade pastures. The woody stems grow rapidly and are 2.5 to 3 feet tall late in June, when the first blossoms appear. Blossoming continues until late fall. The small, individual blue flowers are clustered in erect spikes. This bitter-leaved plant is rarely eaten, even in very low-grade pastures where good forage is rare. When all the grasses are dry, this plant still remains green, and often blooms profusely". Weber characterizes it as having "Spikes stout, blunt at the apex; leaves light green, whitened by appressed pubescence; flowers light blue" and says that it is found on "Plains and mesas, abundant in very badly overgrazed areas." The corollas are described as "purple" on Bare 207 and B. Hutchins 1323 and as "lavender to pale-purple" on C. M. Rowell 4115. Patermann (1935) records the diploid chromosome number as 12, while Dermen (1936), Noack (1937), and Poindexter (1960) give it as 14.

Abrams (1967) records V. stricta from Stevens County, Washington; Brown & Wherry (1971) say that it has been introduced in Cape May County, New Jersey; Cochrane & the Rices (1971) describe it as common in fields and pastures of Rock County, Wisconsin; Dobbs (1963) reports it as "Generally distributed throughout [Henry County, Illinois] as a common weed on sandy roadsides and often locally abundant in dry sandy fallow fields". Domville & Dunbar (1970) describe it as "rare in dry places" in Ulster County, New York, blooming there in the summer. Gattinger (1894) tells us that in his time it was "abundant" in the "Counties along the Mississippi river, in sandy soils", flowering there in July, and the "whole plant" was used medicinally.

Grimm (1968) describes V. stricta as a "densely pale-hairy plant with a quite roundish, simple or sparingly branched stem 1 to 4 feet tall. The leaves are stalkless or nearly so, sharply-toothed, and 2 to 4 inches long. Its flowers are deep blue or purple, a bit over 1/4 inch across; and in dense, narrow, blunt-tipped, and practically stalkless clusters. It grows in dry open places from N. Y. and Ont. to Mont. south to Tenn., Ark., Okla., Tex., and N. Mex. Introduced in the Northeast. It flowers June to September." Harger (1930) found it in Fairfield and Litchfield Counties, Connecticut.

Hitchcock and his associates (1959) describe the plant as "Short-lived, perhaps sometimes annual, plants with one or several

erect stems 3—12 dm. tall arising from a taproot; herbage densely and conspicuously spreading-hairy, or the hairs of the upper surface of the leaves often appressed; leaves wholly cauline, narrowed to a sessile or subpetiolar base rarely as much as 1 cm. long, the blade broadly elliptic or ovate, 4—11 cm. long, 2—5 cm. wide, coarsely (often doubly) serrate, firm and evidently rugose-veiny; spikes elongate, 6—30 cm. long, typically few or solitary, terminating the stem and branches, more numerous when the stem is more branched; bracts lance-subulate, 4 mm. long, equaling or slightly shorter than the 4—5 mm. calyx; corolla deep blue or purple, the tube 6—7 mm. long, the limb 7—11 mm. wide". They report that in the northwestern part of North America it inhabits "Roadsides and other dry places; a characteristic species of the prairies and plains of c. U. S., extending w. through n. Ida. to n.e. Wash., and introduced eastward to the Atlantic", flowering from June to September. Lakela (1965) cites Lakela 2669 & 5175 as the only known collections from northeastern Minnesota. Lowe (1921) found it on damp open ground on bluffs in Tishomingo County, Mississippi; Meyncke (1885) reports it from Franklin County, Indiana, Mohlenbrock (1968) from Pope County, Illinois, and Moore (1965) from Yell County, Arkansas. Morley avers that it is "common in grazed prairie pastures" in Republic County, Kansas, while Ownbey & Monserud (1971) tell us that in Minnesota it inhabits "Moist to dry prairie and barren fields. Found in the southern and southwestern parts of the state, south and west of a line joining Washington and Clay Counties; also reported from near Duluth."

Radford, Ahles, & Bell (1964) describe it as "rare in pastures and along roadsides" in Onslow County, North Carolina, blooming there from June to September. Reed & Hughes (1970) give its distribution as "Prairies and barrenlands, pastures, old fields, and waste places. Native. Throughout all the United States excepting areas in northern New England and New York, the Southeastern States along the Atlantic and gulf coasts, an area between central Montana and central Minnesota, and an area in the west from Washington and Idaho south to the Mexican border; north into southern Ontario; south into eastern Mexico." They give a map showing this purportedly continuous distribution, but this differs very considerably from the actual distribution of the species as mapped by myself on the basis of actual herbarium specimens examined. I do not know it at all from the states of Oregon or California where they give its distribution as continuous; I know it only from northeastern Washington, while they show it only from the westernmost parts of that state; I know it from parts of Idaho, Utah, and Arizona, where they claim that it does not occur. Intensive field work in Texas by many botanists has revealed its presence so far in only five widely scattered counties instead of continuous in 3/4th of the state as indicated on their map. It is most certainly not continuous in Massachusetts, Rhode Island, Connecticut, New Jersey, Delaware, Pennsylvania, West Virginia, Kentucky, and Tennessee as indicated on their map -- it is actually known from a

very few widely scattered localities in these states as an accidental introduction. I do not know it at all from Maryland or Virginia, where they indicate that it is abundant, but it does occur in isolated spots in North Carolina, Georgia, and Alabama. Rowell describes it as "occasional in moist areas" in Hemphill County, Texas. Beebe & Hoffman (1968) record it from Union County, South Dakota.

Swink (1969) says that in the Chicago area V. stricta is found "In rocky pastures [where] it occurs with.....Verbascum thapsus, Cynoglossum officinale, and Lappula echinata.....Frequent in overgrazed gravelly pastures, where it associates with Cynoglossum officinale, Eupatorium altissimum, Hordeum jubatum, Nepeta cataria, Poa pratensis, Verbascum thapsus, and Verbena simplex. It is also frequent in sandy abandoned fields, with Ambrosia artemisiifolia elatior, Cassia fasciculata, Lespedeza capitata, Monarda punctata villicaulis, Oenothera rhombipetala, Opuntia humifusa, Plantago lanceolata, Rumex acetosella, and Silene antirrhina. It occasionally grows along railroads and on roadsides. Rarely it is found in gravelly, degraded prairie remnants, growing with Achillea millefolium, Amorpha canescens, Arenaria stricta, Asclepias verticillata, Coreopsis lanceolata, Echinacea pallida, Kuhnia eupatorioides corymbulosa, Lithospermum incisum, Petalostemon purpureum, Poa compressa, Potentilla arguta, Psoralea tenuiflora, and Solidago rigida."

Tatnall (1946) reports it "occasionally established on roadsides and waste ground" in Delaware; Wheeler (1900) cites W. A. Wheeler 401 from Jefferson, Minnesota [perhaps an error for Jeffers in Cottonwood County?]; the Winters & Van Bruggen (1959) record it as "common in old pastures" in South Dakota; while Wunderlin (1966) reports it as common in waste ground and on prairies in Carroll County, Illinois, and cites Wunderlin 49 & 130. Stephens found it abundant in sandy soil of weedy wooded riverbanks in Platte County, Nebraska.

Shinn (1967) found the flowers of Verbena stricta visited by the bees, Calliopsis nebraskensis and C. verbenae. Chaymol (1937) isolated verbenaloside from the species, fat and glucoside were reported from it by Zufall & Richtman (1944), and ursolic acid by King and his associates (1950). McCarthy & Morrow (1969) found that in a long-term experiment on rundown pastures in Nebraska, regular spraying with 2,4-D significantly reduced the number of plants of Verbena stricta along with Vernonia baldwini, Aster multiflorus, and species of Solidago, whereas it increased the number of such plants as Asclepias syriaca, A. verticillata, Physalis heterophylla, Chamaelirium luteum, and species of Cirsium.

Thornberry (1966) records the following fungi attacking Verbena stricta: Ascochyta verbenae Siem. (a leaf-spot) in Wisconsin,

Cercospora verbenae-strictae Pk. in Illinois and Kansas, Erysiphe cichoracearum P. DC. (a powdery mildew) general over its range, Phyllosticta texensis Seaver (a leaf-spot) in Texas, Puccinia vilfae Arth. & Holw. from Indiana to Oklahoma and South Dakota, and Septoria verbenae Rob. (a leaf-spot) from Vermont to Mississippi, Texas, and South Dakota [actually I have no record of V. stricta growing anywhere in Vermont].

It should be noted here that the Tischler (1927) publication cited in the bibliography of Verbena stricta is sometimes cited as "Pflanzl. Chrom." Pellett (1931) has identified the plant in his illustration as "blue vervain", but it certainly represents V. stricta and not V. hastata. The cultivated specimens cited below from the University of Michigan Botanical Garden were grown there from seed collected by Wernecke near Royal, Nebraska, in September of 1928.

Material of V. stricta has been misidentified and distributed in some herbaria as V. xutha Lehm. On the other hand, the H. M. Parker 501, distributed as V. stricta, is actually V. delticola Small, Cumbie 173 is V. halei Small, Beetham s.n. [Sept. 19, 1966] and Cumbie 89 are V. hastata L., Tyson, Dwyer, & Blum 4300 is V. litoralis H.B.K., P. O. Schallert 1961 is V. rigida Spreng., and C. L. Porter 5150 is Salvia sp. in the Lamiaceae.

Additional citations: ILLINOIS: Marion Co.: M. S. Bebb s.n. [Salem, 1860] (W--2549471). McHenry Co.: H. R. Bennett s.n. [August 10, 1957] (Se--180362). Tazewell Co.: V. H. Chase 17507 (Se--218575). IOWA: Story Co.: Birkenholz 21 (Se--171506); B. Martin 86 (Se--171507). Woodbury Co.: Williges 232 (Au--177991). MICHIGAN: Saint Clair Co.: C. K. Dodge s.n. [8/31/97] (Lk). WISCONSIN: Dane Co.: Ferry 8466 (Mi); C. G. Shaw s.n. [August 1, 1941] (Se--121159). Iowa Co.: T. J. Hale s.n. [Arena] (W--2549470). MINNESOTA: Hennepin Co.: S. F. Blake 326 [Herb. Blake 1280] (Ld). Rock Co.: P. Johnson 327 (Se--202345). SOUTH DAKOTA: Nemo Co.: P. Johnson 254 (Se--201265). Pennington Co.: Bartlett & Grayson 1325 (N). KANSAS: Osage Co.: W. H. Horr E.33 (Au--122280, N). Republic Co.: Morley 909 (N). MISSOURI: Jefferson Co.: Collector undetermined s.n. [Bushberg, May 9, 1883] (Au--122720). Saint Francois Co.: L. F. Ward s.n. [Aug. 24, 1878] (Au--122719). County undetermined: Trécul 494 (W--2546677). Saint Louis: Engelmann s.n. [St. Louis, Aug. 1843] (Au--122721). ARKANSAS: Baxter Co.: Demaree 29314 (Au--122746). Clay Co.: Demaree 27030 (Au--122750). Craighead Co.: Demaree 5085 (N, N, Rf), 30772 (Au--122753). Faulkner Co.: Demaree 5936 (N), 5971 (N). Independence Co.: Demaree 26792 (Au--122748). Marion Co.: Demaree 30909 (Au--122751). Washington Co.: F. L. Harvey 61 (Mi); B. J. Turner s.n. [Summer 1939-40] (Au--122745). WYOMING: Albany Co.: C. L.

Porter 7151 (Se—172308). Crook Co.: Welsh, Moore, & Matthews 9269 (N). COLORADO: Baca Co.: Weber & Anderson 5204 (Se—127055). Boulder Co.: W. A. Weber 5270 (Se—131320). Yuma Co.: Maslin 4271 (Se—187547). NEBRASKA: Banner Co.: Porter & Porter 8752 (Se—209097). Cherry Co.: Boivin 13815 (N); Ostenson 1 (Mi). Platte Co.: S. Stephens 49032 (N). OKLAHOMA: Alfalfa Co.: Stratton 1280 (Lk), Comanche Co.: E. J. Palmer 11748 (N). FeFlore Co.: Bare 207 (N). Murray Co.: Hopkins, Nelson, & Nelson 659 (Se—98542). Pontotoc Co.: G. T. Robbins 3176 (N, Se—153533). TEXAS: Hemphill Co.: Blassingame s.n. [June 20, 1964] (Lk); B. Hutchins 1323 (Lk); C. M. Rowell 4115 (Lk—photo, Lk—photo, Lk), 10380 (Lk). Wheeler Co.: L. C. Higgins 4537 (N). CULTIVATED: Michigan: Herb. Univ. Mich. Bot. Gard. 11965 (Mi), 11966 (Mi). LOCALITY OF COLLECTION UNDETERMINED: A. Brown s.n. (N).

VERBENA STRICTA f. ALBIFLORA Wadmond

Additional bibliography: Dobbs, Fl. Henry Co. 231. 1963; Moldenke, Phytologia 16: 205. 1968; Reed & Hughes, U. S. Dept. Agr. Agric. Handb. 366: [Common Weeds U. S., pr. 1] 308. 1970; Reed & Hughes, Common Weeds U. S., pr. 2, 308. 1971; Moldenke, Fifth Summ. 1: 14, 35, 38, 41, 42, 44, 46, 47, 52, & 54 (1971) and 2: 673, 697, 698, & 920. 1971.

Stephens & Brooks encountered this form "abundant" in dry sandy-rocky clay soil on a prairie pasture hillside, while Dobbs (1963) found only a single plant in a dry sandy fallow field.

Additional citations: IOWA: Emmet Co.: W. H. Welch 9701 (Au—122752). SOUTH DAKOTA: Stanley Co.: Stephens & Brooks 33953 (N). KANSAS: Ellsworth Co.: Bare 2104 (N). ARKANSAS: Stone Co.: Demaree 27888 (Au—122749).

VERBENA STRICTA f. ROSEIFLORA Benke

Additional bibliography: Dobbs, Fl. Henry Co. 230. 1963; Moldenke, Phytologia 11: 480. 1965; Reed & Hughes, U. S. Dept. Agr. Agric. Handb. 366: [Common Weeds U. S., pr. 1] 308. 1970; Reed & Hughes, Common Weeds U. S., pr. 2, 308. 1971; Moldenke, Fifth Summ. 1: 35, 40, 41, 44, 46, 50, 52, & 54 (1971) and 2: 920. 1971; Ownbey & Monserud, Common Wild Fls. Minn. 313. 1971.

Magrath & Hays found this plant "scattered" in sandy soil of a moist slough in grazed prairie pastures, while Dobbs (1963) refers to it as "rare. Known only from two stations, one being on the border of a small woodland.....and the other on the dry sandy open margin" of a canal in Henry County, Illinois. The corollas are said to have been "pink" on Magrath & Hays 5602.

Additional citations: NEBRASKA: Phelps Co.: Magrath & Hays 5602 (N).

VERBENA STRIGOSA Cham.

Additional bibliography: Angely, Fl. Anal. Paran., ed. 1, 573. 1965; Moldenke, Phytologia 16: 205. 1968; Angely, Fl. Anal. Fito-

geogr. Est. S. Paulo, ed. 1, 4: 840 & xix, map 1395. 1970; Reitz, Sellowia 22: 145. 1970; Moldenke, Fifth Summ. 1: 179 (1971) and 2: 920. 1971.

Additional citations: BRAZIL: Paraná: Hatschbach 22574 (N).

VERBENA SUBINCANA (Troncoso) Shinners

Additional bibliography: J. A. Clark, Card. Ind. Gen. Sp. Var. issue 248 (1964) and 251. 1965; Hocking, Excerpt. Bot. A.11: 124. 1967; Moldenke, Phytologia 16: 205. 1968; Schnack & Rubens, Bol. Soc. Argent. Bot. 13: 206. 1970; G. Taylor, Ind. Kew. Suppl. 14: 63. 1970; Moldenke, Fifth Summ. 2: 522, 920, & 968. 1971.

Schnack & Rubens (1970) record this species from Entre Ríos, Argentina.

VERBENA SUBPALUDOSA Malme

Synonymy: Verbena subpaludosa "Malme ex Angely" apud Angely, Fl. Anal. Paran., ed. 1, 573. 1965.

Additional bibliography: Angely, Fl. Anal. Paran., ed. 1, 573. 1965; Moldenke, Phytologia 11: 240. 1965; Moldenke, Fifth Summ. 1: 179 (1971) and 2: 699 & 920. 1971.

VERBENA SUBULIGERA Greene

Additional bibliography: Moldenke, Phytologia 11: 240—241. 1965; Moldenke, Fifth Summ. 1: 77 (1971) and 2: 699 & 920. 1971.

xVERBENA SUKSDORFI Moldenke

Additional bibliography: Moldenke, Phytologia 11: 241—242. 1965; Moldenke, Fifth Summ. 1: 372 (1971) and 2: 679, 684, 699, 782, & 920. 1971.

VERBENA SULPHUREA D. Don

Additional synonymy: Glandularia sulphurea (D. Don in Sweet) Schnack & Covas apud J. A. Clark, Card Ind. Gen. Sp. Var. issue 183. 1944. Glandularia sulfurea (D. Don) Schnack & Covas ex J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 616. 1960.

Additional & emended bibliography: Lorents & Niederlein. Bot. Exped. Rio Negro 266. 1889; Reiche & Phil., Fl. Chil. 5: 273 & 289—290. 1910; Goyena, Fl. Nicarag. 1: 558. 1911; J. A. Clark, Card Ind. Gen. Sp. Var. issue 183. 1944; Acevedo de Vargas, Bol. Mus. Nac. Hist. Nat. Chile Santiago 25: 65—67. 1951; Cabrera, Bol. Soc. Argent. Bot. 5: 96. 1953; J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 614, 616, & 625. 1960; Moldenke, Phytologia 16: 205—206. 1968; Moldenke, Résumé Suppl. 16: 28. 1968; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl. 717. 1969; Heusser, Pollen & Spores Chile 61—62, pl. 58-667. 1971; Moldenke, Phytologia 22: 466. 1971; Moldenke, Fifth Summ. 1: 193, 202, & 372 (1971) and 2: 522, 619, 621, 660, 681, 699, & 920. 1971; Moldenke, Phytologia 23: 431 & 437. 1972.

Additional illustrations: Heusser, Pollen & Spores Chile pl. 58-667. 1971.

Heusser (1971) describes the pollen of this plant as "Monad,

isopolar, radiosymmetric; tricolporate, colpi lengthy, relatively broad, appearing constricted at the equator and with only a poroid area in some specimens, in others with a distinct transverse or more or less circular protruding pore interrupting the colpus, colpi membranes granular; subprolate, amb subtriangular; exine ca 1 μ thick, faintly tectate, more or less psilate; 41—70 x 36—56 μ", based on material collected by C. Jiles P. in Coquimbo, Chile, in September 1942 [SGO 57599]. He gives the overall distribution of the species as "Province of Antofagasta—Araucaría". Schnack & Covas (1944) report its diploid chromosome number as 10.

Goyena (1911) records this species from Nicaragua, where, he says, it is called "no me olvides". This seems most doubtful to me, unless it is cultivated for ornament there. Schnack & Covas (1945) cultivated it in Argentina.

Additional citations: CHILE: Coquimbo: Zöllner 4399 (Ac).

VERBENA SULPHUREA f. ALBA Moldenke

Additional bibliography: Moldenke, Phytologia 13: 268. 1966; Moldenke, Fifth Summ. 1: 193 (1971) and 2: 920. 1971.

VERBENA SULPHUREA var. CANESCENS R. A. Phil.

Additional bibliography: Moldenke, Phytologia 11: 480. 1965; Moldenke, Résumé Suppl. 16: 28. 1968; Moldenke, Fifth Summ. 1: 193 (1971) and 2: 699 & 920. 1971.

VERBENA SULPHUREA var. FUSCORUBRA Skottsberg

Synonymy: Verbena sulphurea f. fuscorubra Skottsberg ex Moldenke, Phytologia 11: 480, sphalm. 1965.

Additional bibliography: Moldenke, Phytologia 11: 480. 1965; Moldenke, Fifth Summ. 1: 193 (1971) and 2: 920. 1971; Moldenke, Phytologia 23: 437. 1972.

VERBENA SULPHUREA var. INTERMEDIA Kuntze

Additional bibliography: Moldenke, Phytologia 11: 249—250. 1965; Moldenke, Fifth Summ. 1: 193 & 202 (1971) and 2: 699 & 920. 1971.

VERBENA SULPHUREA var. LONGITUBA Kuntze

Additional bibliography: Moldenke, Phytologia 11: 250. 1965; Moldenke, Fifth Summ. 1: 193 (1971) and 2: 699 & 920. 1971.

VERBENA SULPHUREA var. PEDUNCULATA C. Gay

Additional bibliography: Moldenke, Phytologia 11: 250. 1965; Moldenke, Fifth Summ. 1: 193 (1971) and 2: 921. 1971.

VERBENA SULPHUREA var. SCABRA Acevedo de Vargas

Additional bibliography: Cabrera, Bol. Soc. Argent. Bot. 5: 96. 1953; Moldenke, Phytologia 11: 251. 1965; Moldenke, Fifth Summ. 1: 193 (1971) and 2: 921. 1971.

VERBENA SULPHUREA var. TALTALENSIS Moldenke

Additional bibliography: Moldenke, Phytologia 13: 268. 1966;

Moldenke, Fifth Summ. 1: 193 (1971) and 2: 921. 1971.

VERBENA SUPINA L.

Additional & emended synonymy: Verbenaca supina sive foemina Fuchs, Hist. Plant. Basil. 593. 1542. Verbenaca supina Matth., Pl. Epit. Util. 797. 1586. Verbena sacra Gerarde, Herb., ed. 1, 580, fig. 2. 1597. Verbenaca supina Dodon., Stirp. Hist. Pemptad., ed. 2, 149--151. 1616. Verbenaca supina Cord. apud A. Haller, Enum. Meth. Stirp. Helv. Indig. 1: 661, in syn. 1742. Verbenaca supina s. femina Fuchs apud A. Haller, Enum. Meth. Stirp. Helv. Indig. 1: 661, in syn. 1742. Verbena tenuifolia Hill, Brit. Herb. 356 & [536]. 1756. Verbena tenuifolia Tourn. ex Moldenke, Phytologia 23: 437, in syn. 1972. Verbena supina Dodon. ex Moldenke, Phytologia 23: 437, in syn. 1972.

Additional & emended bibliography: Fuchs, Hist. Plant. Basil. 593. 1542; Matth., Pl. Epit. Util. 797. 1586; Gerarde, Herb., ed. 1, 580--582, fig. 2. 1597; Dodon., Stirp. Hist. Pemptad., ed. 2, 149--151. 1616; Gerarde, Herb., ed. 2, 717--719, fig. 2. 1633; Tourn., Compl. Herb. 357. 1719; J. Hill, Brit. Herb. 356 & [536]. 1756; Russell, Nat. Hist. Aleppo, ed. 1, 40. 1756; L., Sp. Pl., ed. 2, 29. 1762; Crantz, Inst. Rei Herb. 1: 573. 1766; [Retz.], Nom. Bot. 11. 1772; J. F. Gmel. in L., Syst. Nat., ed. 13, pr. 1, 2: 42. 1789; Russell, Nat. Hist. Aleppo, ed. 2, 2: 242. 1794; J. F. Gmel. in L., Syst. Nat., ed. 13, pr. 2, 2: 42. 1796; Balbis, Cat. Pl. Hort. Bot. Taur. 48. 1804; Sibth. & Sm., Fl. Graec. Prodr. 1 (2): 402. 1809; Balbis, Cat. Stirp. Hort. Acad. Taur. 80. 1813; Pers., Sp. Pl. 3: 346. 1819; Steud., Nom. Bot. Phan., ed. 1, 873 & 874. 1821; Jan, Elench. Pl. 1. 1824; Moris, Stirp. Sard. El. 1: 37. 1827; Sibth. & Sm., Fl. Graec. 6: 44, pl. 554. 1827; Gussone, Fl. Sic. Prodr. 2: 145--146. 1828; Reichenb., Fl. Germ. Exc. 2: 334. 1830; Tenore, Syll. Vasc. Pl. 298. 1831; Tenore, Syll. Pl. Vasc. Fl. Neapol. App. 4: 86. 1831; Colla, Herb. Pedem. 4: 494. 1835; Tenore, Fl. Nap. 3: 20. 1836; Bertol., Fl. Ital. 6: 261 & 263--264. 1844; Gussone, Fl. Sic. Syn. 2: 108. 1844; Reichenb., Icon. Fl. Germ. 18: 52, pl. 91 (1292) & 103. 1857; Moris, Stirp. Sard. Fl. 3: 342. 1859; Ces., Passer., & Gib., Comp. Fl. Ital. 327. 1874; Nyman, Consp. Fl. Eur. 563. 1881; Arcang., Compend. Fl. Ital., ed. 1, 561 & 885. 1882; Caruel in Parl., Fl. Ital. 6: 334. 1884; Tornabene, Fl. Sic. 418. 1887; Tornabene, Fl. Aetnea 3: 171--172. 1891; Arcang., Compend. Fl. Ital., ed. 2, 445 & 831. 1894; Battandier & Trabut, Fl. Anal. & Synop. Alg. 272 & 459. 1902; Almagia in Pirotta, Fl. Col. Erit. 1: [Ann. Inst. Bot. Roma 8:] 130. 1903; Bég. & Vacc., Ann. di Bot. 12: 118. 1913; Pampanini, Nuov. Giorn. Bot. Ital., n. s., 23: 284. 1916; Lázaro e Ibiza, Comp. Fl. Espaf., ed. 3, 3: 297. 1921; Cavara, Atti Soc. Ital. Progr. Sc. 14: 337. 1925; Bouloumoy, Fl. Liban & Syrie 259. 1930; Pampanini, Prodr. Fl. Círen. 384. 1930; Cheymol, Bull. Soc. Chim. Biol. 19: 1647--1653. 1937; Cheymol, Chem. Abstr. 32: 2977. 1938; Savage, Cat. Linn. Herb. Lond. 4. 1945; Berhaut, Fl. Sénégal, ed. 1, 65. 1954; F. Herman, Fl. Nord & Mitteleur. 839. 1956; Montasir

& Hassib, Ill. Fl. Egypt 1: 389. 1956; V. Täckholm, Stud. Fl. Egypt 154. 1956; Humbert, Fl. Sahara Sept. & Cent. [406] & 407, fig. 149. 1958; Lems, Sarracenia 5: 79. 1960; Buia, Fl. Mic. Illustr. Rep. Pop. Rom. 401 & 403, fig. 369. 1961; Quezel & Santa, Nouv. Fl. Alg. 2: 780. 1963; Al-Rawi, Iraq Min. Agr. Tech. Bull. 14: 149. 1964; Berhaut, Fl. Sénégal, ed. 2, 158. 1967; Patzak & Rech. in Rech., Fl. Iran. 43: 2 & 8. 1967; Zukowski in Pawlowskiego, Fl. Polsk. 11: 64 & 65. 1967; Moldenke, Phytologia 16: 206—207. 1968; Moldenke, Résumé Suppl. 16: 13 (1968) and 17: 4. 1968; Farnsworth, Blomster, Quimby, & Schermerh., Lynn Index 6: 267. 1969; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl. 717. 1969; Michel, Naegelé, & Toupet, Bull. Inst. Fond. Afr. Noire A.31: 800. 1969; A. Pedersen, Bot. Tidsskr. 64: [342] & 357. 1969; Polunin, Field Guide Fls. Eur. 343. 1969; Daoud & Sheikh, Bull. Coll. Sci. Univ. Baghdad 11 (2): 24—44. 1970; El-Gazzar & Wats., New Phytol. 69: 483 & 485. 1970; Kunkel, Cuad. Bot. Canar. 8: 36. 1970; Kunkel, Monog. Biol. Canar. 1: 40. 1970; Willaman & Li, Lloydia Suppl. 33 (3a): 220. 1970; Anon., Biol. Abstr. 52 (5): B.A.S.I.C. S.238 & S.240. 1971; N. F. Good, Biol. Abstr. 52: 2515. 1971; Moldenke, Fifth Summ. 1: 32, 203—211, 213, 215, 265, 266, 269, 306, 349, & 372 (1971) and 2: 594, 618, 668, 669, 686, 691, 692, 696, 699—702, 707, & 921. 1971; Moldenke, Phytologia 23: 265, 419, 436, & 437. 1972.

Additional & emended illustrations: Gerarde, Herb., ed. 1, 580, fig. 2. 1597; Dodon., Stirp. Hist. Pemptad., ed. 2, 150. 1616; Gerarde, Herb., ed. 2, 718, fig. 2. 1633; Reichenb., Icon. Fl. Germ. 18: pl. 91 (1292). 1857; Humbert, Fl. Sahara Sept. & Cent. [406], fig. 149. 1958; Buia, Fl. Mic. Illustr. Rep. Pop. Rom. 403, fig. 369. 1961.

The Verbena sacra of Gerarde (1597) has been reduced previously by me to the synonymy of V. officinalis L., but a re-examination of the illustration given by Gerarde indicates plainly that the plant which he was describing is what we now know as V. supina L. According to Savage (1945), sheet number 16 under genus 35, VERBENA, in the Linnean Herbarium, is inscribed "supina" in Linnaeus' own handwriting and may thus be considered the type.

Matthioli (1586) quotes Dioscorides: "Ramulos emittet cubitales aut maiusculos, angulosos, in quibus ex internallis folia exeunt quercus sed minora, & angustiora, eiusdem in ambitu diuisuris, colore aliquantemus caesio. Radix loga tenuis. Flores purpurei, graciles." Also, "Folia cum radice in vino pota, illitáve, serpentiam ictibus auxiliantur. Folia bibuntur comode ex vino vetere quadragenis e duebus ad icteritiam: veteres tumores & inflammationes mitigant: sordide ulcera purgat: tota in vino decocta tonsillarum crustas abrumpit: oris noman gargarizatu cohibet, Datur potandum in tertianis febribus, tertium à terra geniculum, cum foliis circundantibus: quartanis quartum. Sacram vocat herbam, quoniam multum ad amuleta, expiationesque commendetur."

Täckholm (1956) points out that sterile specimens of Verbena supina have very much the general appearance of Ambrosia maritima. The corollas on Barkley & Ha'if 4003 are described as having been

"lavender". The Kotschy 447 collection, cited below, exhibits stems which seem at first to have been prostrate, but the tips and branches are erect. This is probably the typical form of the species, since in f. erecta Moldenke all the stems are erect from the beginning. Kotschy's plant was growing as a weed in fields of Vicia faba. Covas & Hunziker (1954) report the diploid chromosome number as 14. Cheymol (1937) isolated verbenaloside from the species. Additional vernacular names reported for it include "berbena", "berbenaca", "briina", "brivina", "djaïda", "Eisenkraut", "fine-leaved vervain", "procumbent vervain", "thin-leav'd vervain", "thin-leaved vervain", "vermonacola", and "veruaine".

Patzak & Rechinger (1967) describe the corolla color as "coerulescens" and give the overall distribution of the species as "Regio Mediterranea a Makaronesia et Lusitania et Hispania orientem versus usque ad Mesopotamiam, Rossiam australem, Transcaucasiam et Turcomaniam". Polunin (1969) notes that the species is much like V. officinalis L., "but stems procumbent, much-branched, and lvs. twice cut into oval segments. Corolla pale lilac, shorter, 3 mm. Southern Europe". Bouloumoy (1930) tells us that it is found in the "région moyenne du Liban, et au Nord près d'Antioche", with flowers that are "bleuâtres, petites, subsessiles", growing on "Terrains sableux ou argileux inondés ou très humides" in Lebanon and Syria. Berhaut (1967) cites Berhaut 554 from Sénégal, while Kunkel (1970) records it from Lobos Island in the Canaries, citing Kunkel 11978, a few plants of which he found growing among Euphorbia and Atriplex near a garden. Lázaro e Ibiza (1921) records it from central, eastern, and southern Spain, where he says that it blooms from May to October; Lems (1960) records it from the islands of Fuerteventura, Lanzarote, and Tenerife in the Canaries; Montasir & Hassib (1956) describe the plant as a weed along canal banks of the Nile river and the western Mediterranean; Pampanini (1930) cites Ruhmer s.n. [Bengasi, 1882], Vaccari s.n. [Berka, 1913], and Zanon s.n. [Raaba, 1915] from Cyrenaica; and Pedersen (1969) records it from Denmark. Pampanini also cites "Bég. e Vacc. ...Schedae ad fl. lib. exs., 60, n. 183". Humbert (1958) records it from "Tout le Sahara septentrional, assez commun, dans les dépressions argilo-limoneuses et les dayas", while Quezel & Santa (1963) record it from "dans toute l'Algérie" and list the vernacular name "djaïda" for it from that area.

Material of Verbena supina has been misidentified and distributed in some herbaria under the names V. hastata L. and Lippia repens Spreng. On the other hand, the Askari 1015, distributed as V. supina, is not verbenaceous and Kuntze s.n. [Granada, 21/6/82] is a mint. Almagia (1903) cites Pappi 432 and Terracciano & Pappi 160, 309, 311, 2491, & 2523 from Eritrea, growing there at altitudes of 2200—3400 meters.

Additional citations: SPAIN: E. Reverchon s.n. [Malaga, 27 août 1888] (Se—140865). ALGERIA: A. Dupuis 190 (Se—128038). SUDAN: Nubia: Kotschy 447 (W—2496926). IRAQ: Barkley & Ha'if

4003 (N).

VERBENA SUPINA f. ERECTA Moldenke

Additional bibliography: Desf., Fl. Atlant. 1: 17. 1800; Gussone, Fl. Sic. Prodr. 2: 146. 1828; Moldenke, Phytologia 16: 207. 1968; Moldenke, Fifth Summ. 1: 205, 206, 208, 209, 211, & 266 (1971) and 2: 699 & 921. 1971; Moldenke, Phytologia 23: 419. 1972.

Gussone (1828) does not name this form, but describes it as follows: "b. caule erecto, foliisque glabriusculis Desf. Atl. 1. p. 17 — Varietas b. inter hanc et praecedentem [V. officinalis L.] media; cum illa caule erecto, cum hac foliis, floribus, fructibusque convenit. An hybrida?" Presumably he found it in Sicily. I do not believe that it is hybrid in nature.

Recent collectors describe the plant as a perennial. The Davises found it growing in sandy places at the edge of a cornfield in Morocco, at 200 meters altitude, flowering in March. The corollas are described as having been "violet" in color on Davis & Davis D.48616.

Additional citations: MOROCCO: Davis & Davis D.48616 (N).

VERBENA SUPINA var. MINOR Post

Additional bibliography: Moldenke, Phytologia 11: 260—261. 1965; Moldenke, Fifth Summ. 1: 266 (1971) and 2: 921. 1971.

VERBENA SWIFTIANA Moldenke

Additional bibliography: Moldenke, Phytologia 11: 261—262. 1965; Moldenke, Fifth Summ. 1: 179 & 202 (1971) and 2: 921. 1971.

Recent collectors have encountered this plant growing on campos, flowering in January. The corollas are said to have been "blue" on G. J. Schwarz 6207.

Additional citations: BRAZIL: Rio Grande do Sul: Rambo 30975 (N). ARGENTINA: Misiones: G. J. Schwarz 4811 (N), 6207 (N).

VERBENA TAMPENSIS Nash

Additional synonymy: Glandularia tampensis Small apud J. A. Clark, Card Ind. Gen. Sp. Var. issue 141. 1933.

Additional bibliography: J. A. Clark, Card Ind. Gen. Sp. Var. issue 141. 1933; Moldenke, Phytologia 16: 207. 1968; Moldenke, Résumé Suppl. 16: 22. 1968; Long & Lakela, Fl. Trop. Fla. 741 & 961. 1971; Moldenke, Fifth Summ. 1: 31 (1971) and 2: 522, 525, 699, & 921. 1971.

Lakela describes this species as "decumbent, branches profuse from the crown" and found it in disturbed open pineland with secondary longleaf pine, sabal, saw palmetto, Myrica, Lyonia, and Befaria. The corollas are described as having been "rose-purple" on Lakela 24997.

Additional citations: FLORIDA: Hillsborough Co.: Lakela 24997 (N), s.n. [28 April 1962] (Ft—9503). Lee Co.: J. K. Small s.n. [Punta Rassa, May 1928] (N).

xVERBENA TEASII Moldenke

Additional bibliography: Arora & Khoshoo, Indian Journ. Genet. & Pl. Breed. 27: 275—277, fig. 1. 1967; Moldenke, Phytologia 16: 207. 1968; Khoshoo & Arora, Am. Hort. Mag. 50: 16—18, fig. 2—5. 1971; Anon., Hort. Abstr. 41: 1117. 1971; Furia, Biol. Abstr. 52: 8978. 1971; Moldenke, Fifth Summ. 1: 372 (1971) and 2: 667, 675, 699, 700, & 921. 1971; Moldenke, Phytologia 23: 427. 1972.

Additional illustrations: Khoshoo & Arora, Am. Hort. Mag. 50: 16—18, fig. 2—5. 1971.

Arora & Khoshoo (1967) report that "fertility breakdowns in the F_1 caused by the interaction of the genomes of V. temuisecta and V. hybrida, result in the upset of the intricate balance controlling fertility [in the hybrid]. However, such an interaction exercises a differential control, affecting only pollen and not ovule fertility. The amphidiploids and triploids are both totally sterile. The amphidiploid is a duplication of the F_1 but unlike the latter due to preferential pairing there is no change, whatsoever, for segregation in the former of factors causing sterility. Since the diploid female gamete for the triploid is derived from the amphidiploid, the latter is also sterile. Heterogeneity is due to segregation of sterility factors in the F_1. On backcrossing with the balance genome of V. hybrida, partial fertility appears immediately. The restoration of balance is due to the harmonious influence of V. hybrida chromosomes. This process can be continued until desired combinations with the desired fertility are obtained."

VERBENA TECTICAULIS Troncoso

Bibliography: Troncoso, Darwiniana 14: 633—636 & 638, fig. 2. 1968; Anon., Biol. Abstr. 50 (18): B.A.S.I.C. S.210. 1969; N. F. Good, Biol. Abstr. 50: 9661. 1969; Moldenke, Fifth Summ. 1: 188 (1971) and 2: 921. 1971.

Illustrations: Troncoso, Darwiniana 14: 634, fig. 2. 1968.

This species is based on Fiebrig 5837 bis, collected in the upper course of the Río Paraná in 1909 or 1910 and deposited in the herbarium of the Darwinion Institute at San Isidro, Argentina. The type material was mixed with Glechon ciliata under the original Fiebrig 5837 number. Troncoso (1968) comments that it is "una especie muy característica, fácilmente diferenciable por sus hojas tricuspidadas, erectas y aplicadas contra los tallos. Posee el hábito de V. Balansae Briq., pero en esta especie las hojas son trífidas hasta la base y sus lacinias son lineares."

VERBENA TENERA Spreng.

Additional synonymy: Glandularia tenera (Spreng.) Cooper ex Moldenke, Fifth Summ. 2: 522, in syn. 1971.

Additional & emended bibliography: A. Gray, Field For. & Gard. Bot., ed. 1, pr. 1, 242 (1868), ed. 1, pr. 2, 242 (1869), and ed. 1, pr. 3, 242. 1880; L. H. Bailey in A. Gray, Field For. & Gard. Bot., ed. 2, 341. 1895; Reiche & Phil., Fl. Chil. 5: 296. 1910;

Lázaro e Ibiza, Comp. Fl. Españ., ed. 3, 3: 297. 1921; Macself in Sanders, Encycl. Gard., ed. 21, pr. 1, 457 (1931), ed. 21, pr. 2, 457 (1934), and ed. 21, pr. 3, 457. 1938; Winge, Proc. Linn. Soc. Lond. 150: 236. 1938; Macself in Sanders, Encycl. Gard., ed. 21, pr. 4, 457. 1942; Cain, Found. Pl. Geogr., pr. 1, 335. 1944; Macself in Sanders, Encycl. Gard., ed. 21, pr. 5, 457 (1945) and ed. 21, pr. 6, 457. 1946; Hellyer in Sanders, Encycl. Gard., ed. 22, pr. 1, 457 (1950) and ed. 22, pr. 2, 506 & 507. 1952; Cabrera, Man. Fl. Alred. Buenos Aires 397 & 398. 1953; J. A. Clark, Card Ind. Gen. Sp. Var. issue 217. 1953; Kuck & Tongg, Mod. Trop. Gard. 213 & 237. 1955; Hellyer in Sanders, Encycl. Gard., ed. 22, pr. 3, 506 & 507. 1956; Emberger in Chadefaud & Emberger, Traité Bot. 2: 829, fig. 1175. 1960; J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 616 & 629. 1960; Willaman & Schubert, Agr. Res. Serv. U. S. Dept. Agr. Tech. Bull. 1234: 237. 1961; W. G. Wright, Wild Fls. South. Afr. 156 & 158. 1963; Angely, Fl. Anal. Paran., ed. 1, 573. 1965; Burkill, Dict. Econ. Prod. Malay Penins. 2: 2266. 1966; Yotaro, Gard. Pl. World 3: 128, pl. 64, fig. 3. 1966; Moldenke, Phytologia 16: 207--209. 1968; Moldenke, Résumé Suppl. 16: 28 (1968) and 17: 8. 1968; Munz, Suppl. Calif. Fl. 101--102. 1968; Munz & Keck, Calif. Fl. 687, 688, & 1679. 1968; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl. 717. 1969; R. F. V. Cooper in Pastore, Bol. Soc. Argent. Hort. 157: 123--125. 1969; Hay & Synge, Dict. Gard. Pl. 177, 369, & 370, pl. 1413. 1969; Reitz, Sellowia 22: 145. 1970; Rickett, Wild Fls. U. S. 4 (3): 539 & 799. 1970; Schnack & Rubens, Bol. Soc. Argent. Bot. 13: 207. 1970; Cain, Found. Pl. Geogr., pr. 2, 335. 1971; Moldenke, Fifth Summ. 1: 32, 179, 190, 202, 203, & 372 (1971) and 2: 522, 621, 652, 670, 684, 689, 699, 700, 789, & 921. 1971; Moldenke, Phytologia 23: 276, 417, 427, 436, & 437 (1972) and 24: 37 & 142. 1972.

Additional illustrations: Emberger in Chadefaud & Emberger, Traité Bot. 2: 829, fig. 1175. 1960; Hay & Synge, Dict. Gard. Pl. 177, pl. 1413 (in color). 1969.

Yotaro (1966) gives a color illustration of what purports to be Verbena tenera, but actually depicts V. tenuisecta Briq. instead. He records the common name "zartes Eisenkraut". Cooper (1969) illustrates his paper with a picture which he labels "Lilac Verbena" and seems to depict neither of the species concerning which his paper deals (V. laciniata and V. tenera). The illustration seems to be of V. dissecta Willd. Kuck & Tongg (1955) reduce V. erinoides Lam. and V. pulchella Sweet to synonymy under V. tenera, but this is manifestly incorrect — V. erinoides is now known as V. laciniata (L.) Briq. and V. pulchella is amply distinct. The V. tenera described and pictured by Wright (1963) is most certainly V. tenuisecta instead!

Beale (1940) reports the diploid chromosome number for V. tenera as 30, while Datta (1952) reports it to be 10 — probably these workers used incorrectly identified material in one or both cases. Bolkhovskikh and his associates (1969) cite Datta's paper as published in "1953".

Lázaro e Ibiza (1921) record V. tenera from Spain, doubtless in cultivation. Munz (1968) tells us that "V. tenera Spreng. and V. temuisecta Briq. are confused and both are to be looked for in Calif. According to one author, V. tenera has the calyx-hairs appressed and V. temuisecta ascending-spreading". Unfortunately, the unidentified "author" quoted by Munz has the characters just reversed! Munz & Keck (1968) record V. tenera as an "escape in Ventura and Los Angeles Counties", California, but I have seen only material of V. tenuisecta from those two counties. Schnack & Rubens (1970) record V. tenera from Uruguay.

The Herter 181a [Herb. Herter 68181] in the University of California herbarium, previously cited by me as V. tenera, proves actually to be V. selloi Spreng., while the Krapovickas & Cristóbal 15910, Pedersen 9176, and H. M. Pollard s.n. [Apr. 28, 1945], distributed as V. tenera, are actually V. temuisecta Briq.

Additional citations: VENEZUELA: Mérida: López-Palacios 2565 bis (Ft).

VERBENA TENERA var. ALBIFLORA Kuntze

Additional bibliography: Moldenke, Phytologia 14: 299. 1967; Moldenke, Fifth Summ. 1: 190 & 202 (1971) and 2: 921. 1971.

VERBENA TENERA var. MAONETTI Regel

Additional synonymy: Verbena tenera mahonetti Hay & Synge, Dict. Gard. Pl. 370. 1969. Verbena peruviana 'Chiquita' Graf, Exot. Pl. Man., ed. 1, 410. 1970.

Additional bibliography: Moldenke, Phytologia 16: 208. 1968; Moldenke, Résumé Suppl. 16: 28 (1968) and 17: 8. 1968; Hay & Synge, Dict. Gard. Pl. 370. 1969; Graf, Exot. Pl. Man., ed. 1, 410 & 831. 1970; Moldenke, Fifth Summ. 1: 10 & 372 (1971) and 2: 649, 682, 691, 699, 700, & 921. 1971; Moldenke, Phytologia 23: 276, 436, & 437 (1972) and 24: 37. 1972.

Additional illustrations: Graf, Exot. Pl. Man., ed. 1, 410. 1970.

This plant is often called "peppermint-stick verbena" by gardeners. Sykes describes it as a prostrate plant with ascending branch ends, the corolla being purple with white margins.

Additional citations: CULTIVATED: New Zealand: W. R. Sykes 1043/64 [Herb. Bot. Div. D. S. I. R. 153305] (Ld, Z).

xVERBENA TENTAMENTA Moldenke

Additional bibliography: Moldenke, Phytologia 11: 280. 1965; Moldenke, Fifth Summ. 1: 372 (1971) and 2: 522, 688, 689, & 921. 1971.

VERBENA TENUISECTA Briq.

Additional synonymy: Verbena ericoides Macself in Sanders, Encycl. Gard., ed. 21, pr. 1, 457, sphalm. in syn. 1931. Glandularia temuisecta Small apud J. A. Clark, Card Ind. Gen. Sp. Var. issue

141. 1933. Glandularia tenuissecta Martínez-Crovetto, Bonplandia 2: 41, sphalm. 1965. Verbena ericoides Hirata, Host Range & Geogr. Distrib. Powd. Mild. 276, nom. nud. 1966.

Additional & emended bibliography: W. Barton, Travels, ed. 1, 436 (1791) and ed. 2, 434. 1794; Macself in Sanders, Encycl. Gard., ed. 21, pr. 1, 457. 1931; J. A. Clark, Card Ind. Gen. Sp. Var. issue 141. 1933; Macself in Sanders, Encycl. Gard., ed. 21, pr. 2, 457 (1934), ed. 21, pr. 3, 457 (1938), ed. 21, pr. 4, 457 (1942), ed. 21, pr. 5, 457 (1945), and ed. 21, pr. 6, 457. 1946; Hellyer in Sanders, Encycl. Gard., ed. 22, pr. 1, 457 (1950) and ed. 22, pr. 2, 506 & 507. 1952; Cabrera, Man. Fl. Alred. Buenos Aires 397 & 398. 1953; Greene & Blomquist, Fls. South 108. 1953; Michalowski, Serv. Tecn. Interam. Coop. Agr. Bol. 169 (1954) and 173. 1955; Hellyer in Sanders, Encycl. Gard., ed. 22, pr. 3, 506 & 507. 1956; Howell & McClintock in Kearney & Peebles, Ariz. Fl., ed. 2, 725 & 727. 1960; J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 614 & 629. 1960; Lewis & Oliv., Am. Journ. Bot. 48: [639]—641, fig. 1. 1961; Reitz, Sellowia 13: 67 & 110. 1961; Hocking, Excerpt. Bot. A.6: 91. 1963; W. G. Wright, Wild Fls. South. Afr. 156 & 158. 1963; Radford, Ahles, & Bell, Guide Vasc. Fl. Carol. 281 & 282. 1964; Angely, Fl. Anal. Paran., ed. 1, 573. 1965; Martínez-Crovetto, Bonplandia 2: 41 & 51. 1965; Solbrig, Castanea 30: 173—174. 1965; Greensill, Trop. Gardening 79. 1966; Hirata, Host Range & Geogr. Distrib. Powd. Mild. 276. 1966; Yotaro, Gard. Pl. World 3: 128, pl. 64, fig. 4. 1966; Arora & Khoshoo, Indian Journ. Genet. & Pl. Breed. 27: 275—277. 1967; Ewan, Southwest. La. Journ. 7: 11. 1967; Hocking, Excerpt. Bot. A.11: 123. 1967; E. Lawrence, South. Gard., ed. 2, 115, 135, 172, & 214. 1967; Carter & Jones, Castanea 33: 203. 1968; W. C. Grimm, Recog. Flow. Wild Pl. 228 & 229. 1968; Hocking, Excerpt. Bot. A.13: 571. 1968; Moldenke, Résumé Suppl. 16: 1, 2, 7, 8, & 22 (1968) and 17: [1], 2, 8, & 12. 1968; Munz, Suppl. Calif. Fl. 101—102. 1968; Pullen, Jones, & Wats., Castanea 33: 333. 1968; Tawada, Okinawa Seibutsu-gakkai [Biol. Mag. Okinawa] 4 (6): 36. 1968; Troncoso, Darwiniana 14: 636 & 638. 1968; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl. 717. 1969; R. F. V. Cooper in Pastore, Bol. Soc. Argent. Hort. 157: 125. 1969; N. F. Good, Biol. Abstr. 50: 9661. 1969; Khoshoo & Arora, Biol. Abstr. 50: 10213. 1969; Khoshoo & Arora, Chromosoma 26: [259]—269, fig. 1, 3, 5, & 6. 1969; Arora & Khoshoo, Euphytica 18: 237—248, fig. 1—25. 1969; Rickett, Wild Fls. U. S. 3 (2): 362 & [363], pl. 110 (1969) and 4 (3): 539, [541], & 799, pl. 176. 1970; Anon., Biol. Abstr. 51: 1687. 1970; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876 & 1877. 1970; Gibson, Fieldiana Bot. 24 (9): 230. 1970; Reitz, Sellowia 22: 145. 1970; Anon., Biol. Abstr. 52 (16): B.A.S.I.C. S.269. 1971; Anon., Hort. Abstr. 41: 1117. 1971; Furia, Biol. Abstr. 52: 8978. 1971; Khoshoo & Arora, Am. Hort. Mag. 50: 16—18, fig. 1, 3, & 5. 1971; Long & Lakela, Fl. Trop. Fla. 741 & 961. 1971; Moldenke, Fifth Summ. 1: 14, 23, 25, 27, 31—33, 39, 46, 47, 49, 60, 63, 66, 77, 86, 106, 111, 128, 144, 179, 184, 188, 190, 203—205, 209, 222, 231, 248, 255, 257, 266,

267, 279, 298, 328, 349, & 372 (1971) and 2: 522, 652, 654, 658, 666, 667, 675, 683, 684, 689, 692, 694, 700, & 921. 1971; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1317 & 1324. 1970; Moldenke, Phytologia 22: 463, 470, 471, 491, & 496 (1972), 23: 194, 216, 219, 279, 283, 284, 369, 427, 431, & 436 (1972), and 24: 129. 1972.

Additional illustrations: Greene & Blomquist, Fls. South 108. 1953; Lewis & Oliv., Am. Journ. Bot. 48: 640, fig. 1. 1961; W. G. Wright, Wild Fls. South. Afr. 157 [as V. tenera]. 1963; Yotaro, Gard. Pl. World 3: pl. 64, fig. 4 [as V. tenera] (in color). 1966; W. C. Grimm, Recog. Flow. Wild Pl. 229. 1968; Arora & Khoshoo, Euphytica 18: 240—242, 245, & 246, fig. 1—25. 1969; Khoshoo & Arora, Chromosoma 26: 261 & 262, fig. 1, 3, 5, & 6. 1969; Rickett, Wild Fls. U. S. 3 (2): [363], pl. 110 (in color) (1969) and 4 (3): [541], pl. 176 (in color). 1970; Khoshoo & Arora, Am. Hort. Mag. 50: 16—18, fig. 1, 3, & 5. 1971.

Recent collectors have found this plant growing in calcareous marl and in slightly saline clay-loam soil, in calcareous clay, in eroded soil on riverbanks, in grasslands, and on wooded hillsides, and describe it as a decumbent perennial herb. The corollas are said to have been "blue" on Descole 2063, Ibarrola 1283, and Ruíz Huidobro 1330 & 3742, "violet-blue" on Liogier 11910, "violet" on Burkart 19469, Hatschbach 15051, Lavastre 2219, and G. J. Schwarz 1059, "lilac" on Fabris 3241 and Krapovickas & Cristóbal 15910, and "purple" on Aguilar 29, 1090, & 1306, Krapovickas & al. 18053, Molina R. 25401, Sultan-ul-Abedin 2643, and Woolston 1661. Lewis & Oliver (1961) record the diploid chromosome number of the species as 10. Hirata (1966) reports the powdery mildew, Microsphaera ferruginea, infesting it in Germany. Greensill (1966) informs us that "cuttings of half-ripe wood strike easily" in propagation efforts.

The Reitz & Klein 17728 collection, cited below, is anomalous in that the calyx is merely strigillose on the outer surface instead of being definitely appressed antrorse-strigose. The Dahlstrand 178 from Transvaal definitely represents a garden escape, according to the collector; Akmad 113, from Iran, is also plainly labeled as not being taken from cultivated material.

Lawrence (1967) continues to misidentify this species as "V. erinoides", calling it "moss verbena" and averring that in the southern parts of the United States it starts to bloom about May 1 and continued to bloom until late autumn. Solbrig (1965), however, accepts Glandularia pulchella var. gracilior Troncoso as the correct name for the plant so widely naturalized in the southern United States. Troncoso (1968) reduces Verbena tenuisecta Briq. to synonymy under what she calls Glandularia aristigera (S. Moore) Troncoso, although I still regard V. aristigera and V. tenuisecta as distinct, albeit closely related, taxa. The illustration given by Yotaro (1966) and labeled "Verbena tenera"

by him actually represents V. temuisecta instead. Likewise, the "Verbena laciniata" of Macself (1931—1946) and of Hellyer (1950—1956) is most probably also V. temuisecta. The V. tenera of Wright (1963) is certainly V. temuisecta instead, as I have seen only material of the latter species from Natal. She says that it "carpets the ground for months at a time in every waste corner, looking especially lovely under blooming Jacaranda trees where they form a kind of 'echo' on the ground." She describes the corolla color as "mauve".

Bartram (1791 & 1794) recounts that "here is likewise a new and beautiful species of Verbena, with decumbent branches and lacerated deep green leaves; the branches terminate with corymbi of Violet blue flowers, this pretty plant grows in old fields where there is good soil." Ewan (1967), in commenting on this passage from Bartram, says "Verbena rigida is an introduced South American species, unknown in the state [of Louisiana] before 1900, and so the species noticed by Bartram near Baton Rouge was more likely V. temuisecta." Personally, I would rather suppose that it was V. canadensis (L.) Britton, a species well known from the Baton Rouge area. I have also seen V. rigida from that area, but not V. temuisecta as yet.

Carter & Jones (1968) record V. temuisecta from Forrest County, Mississippi; Gibson (1970) found it in cultivation in Guatemala; Howell & McClintock (1960) describe it as common along roadsides and in parking areas in Arizona, citing Gould 5303; while Munz (1968) comments as follows: "V. tenera Spreng. and V. temuisecta Briq. are confused and both are to be looked for in Calif[ornia]. According to one author, V. tenera has the calyx-hairs appressed and V. temuisecta ascending-spreading. The latter is described as having lvs. 2—4 cm. long, segms. mostly ca 1 mm. wide; corolla-limb ca 10 mm. wide. -- Reported from Bakersfield region, Kern Co., Twisselmann; native of S. Am. All California material which I have seen seems to be V. temuisecta." I agree that all the California material is V. temuisecta, but the pubescence characters quoted from an unnamed "author" are reversed.

Radford, Ahles, & Bell (1964) record V. temuisecta from pastures and roadsides in the piedmont and central parts of South Carolina north into Richmond, Cumberland, and Duplin Counties, North Carolina, blossoming there from March until frost. Schwarz describes it as "rare" in Corrientes, Argentina.

Khoshoo & Arora (1969) describe a hybrid which they call "V. aubletia x V. temuisecta" — presumably xV. wingei Moldenke. They aver that both parental species "form bivalents during meiosis".

Krapovickas is of the opinion that the natural hybrid between V. temuisecta and V. incisa Hook., which he has seen in the field, is V. calliantha Briq. The hybrid, however, has been described and named xV. trinitensis Moldenke by me (1962) and bears little resemblance to V. calliantha. Briquet's binomial has never formally

been shifted to hybrid status as far as I am aware.

Troncoso (1968), in reducing V. tenuisecta to synonymy under V. aristigera S. Moore, comments that "El estudio del tipo de Verbena aristigera Sp. Moore, que se conserva en el 'British Museum (Nat. History)', ha permitido establecer su identidad con Glandularia tenuisecta del Paraguay. El carácter 'antherarum omnium connectivo apice inappendiculato', dado por Spencer Moore para su especie, es erróneo. Las anteras del ejemplar tipo possen apéndices glandulares, pero éstos son muy reducidos y no sobrepasan las tecas, de ahí que probablemente hayan pasado desapercibidos al autor." She cites S. Moore 1083 from Mato Grosso, Brazil, and Bazzi 230 from Chaco, as well as Jörgensen 2470 and Pierotti 10 from Formosa, Argentina.

Rickett (1969) compares V. tenuisecta with V. bipinnatifida Nutt., saying "V. tenuisecta has leaves similarly divided or cleft, the final parts being even narrower, almost hairlike. It is sparsely hairy, the leaves finally becoming smooth. The corolla is large and handsome, purple, lilac, or rose. The bracts are much shorter than the calyx. This blooms from March to July in eastern Texas and eastward to Florida; it is native to South America, and has been much cultivated in the United States."

Solbrig (1965) informs us that in the Gray Herbarium of Harvard University there is a cultivated specimen of V. tenuisecta collected in New York in 1896, although he identifies it as Glandularia pulchella (Sweet) Troncoso. I have seen a specimen of it collected in Mobile, Alabama, in 1893, already naturalized there.

Macbride (1960) lists V. tenuisecta in his work on the flora of Peru, but comments that whether V. tenera, V. laciniata, V. aristigera, and V. mendocina are actually all distinct taxa "must await results of modern methods of investigation. In any case Briquet's plant as to type is scarcely in Peru." My earlier reporting of the species from Cuzco, Peru, based on Herrera 3450, was erroneous — the specimen seems to represent V. microphylla H.B.K. instead.

Greene & Blomquist (1953), speaking of V. tenuisecta, say "This resembles a true verbena in its flower characteristics but because of its flat-topped inflorescence and appendaged stamens, is sometimes placed in the genus Glandularia. A reclining, hairy plant with opposite, dissected leaves with narrow lobes. Flowers are small but showy, with purple, pink, or white corollas. Sandy or clayey soil, roadsides and waste places. Coastal Plain, Fla. to Ga. and La.", often associated with Phyla nodiflora (L.) Greene. Grimm (1968) also says that "It is commonly seen blooming in the sands along highways in the coastal plain between June and September, from e. N. C. south to Fla. and west to La."

Arora & Khoshoo (1969) have done considerable cytologic work on this species. "Four, out of the maximum of 5 possible, primary trisomics were identified karyomorphologically in Verbena tenuisecta. These are Pseudo Normal, Slender, Semi Erect and Weak, trisomic

for C, A, B and D chromosomes respectively. The trisomics are reasonably distinguishable from one another on the basis of qualitative and quantitative characters, like growth habit and rate, stem thickness, internode length, size and shape of leaves and flowers and fertility. The most common type of association at meiosis is 5 II +1 I followed by 1 III + 4 II. The trisomics differ in the number and type of trivalents. There is a significant increase in range and number of ring bivalents in all trisomics particularly in Slender. This is attributable to a corresponding-ly significant increase in chiasma frequency. The reasons for this are not clear. Anaphase segregation is ordinarily normal and pollen fertility is high except in Semi Erect in which it is correlated with segmentational errors. Although seed setting is apparently normal in all except Slender, yet germinability is very poor. Greater phenotypic effects and lesser tolerance to the addition results in trisomics for the long submedian and satellited A and medium submedian D chromosomes than for B and C chromosomes.

Material of V. temisecta has been misidentified and distributed in some herbaria under the names V. bipinnatifa Reimsch., V. bipinnatifida Schau., V. crinoides Lam., Glandularia tenera (Spreng.) Cabrera, and G. pulchella (Sweet) Troncoso. On the other hand, the Woolston 254, distributed as V. temisecta and so cited by me in a previous installment of these notes, is actually V. aristigera S. Moore, López-Palacios 2565 bis is V. tenera Spreng., and Rodriguez 578 is probably V. temisecta f. rubella Moldenke.

Additional citations: SOUTH CAROLINA: Hampton Co.: Ahles & Bell 10592 (N). Jasper Co.: Ahles & Bell 10443 (Se—199423). Lexington Co.: Leonard & Radford 1654 (N); A. E. Radford 44819 (Au—250986, W—2499723). GEORGIA: Wayne Co.: P. O. Schallert 251 (Se-202512). FLORIDA: Alachua Co.: Janish & Janish 264 (Se—187172). Gadsden Co.: J. K. Small s.n. [Chattahoochee, May 1931] (N). Jackson Co.: Small & Wherry 11707 (N). Taylor Co.: Porter & Porter 8913 (Se—212676). MISSISSIPPI: George Co.: Jones & Jones 11253 (Au—260971). LOUISIANA: Ouachita Par.: R. D. Thomas 3912 (Se—235180). TEXAS: Hardin Co.: Cory 52723 (Mi). Harris Co.: Spoon 21 (Au—248051, Au—248335). Jasper Co.: Lundell & Lundell 10511 (Se—163588). Montgomery Co.: Gould 8580 (Lk). Webb Co.: Netzer 27 (Lk). Zapata Co.: Balleza & Valdez 169 (Lk). ARIZONA: Maricopa Co.: D. F. Howe s.n. [24 April 1966] (Sd—63845). CALIFORNIA: Ventura Co.: H. M. Pollard s.n. [Apr. 28, 1945] (Se—172765). HISPANIOLA: Dominican Republic: Liogier 11910 (Ld, N, N, N, N, N). BRAZIL: Paraná: Hatschbach 15051 (W—2564568); Reitz & Klein 17728 (N, W—2548336). BOLIVIA: Santa Cruz: I. Peredo s.n. [23-XI-1946] (Se—129890). PARAGUAY: Hassler 2650 (Ca—950515); Woolston 1661 (N). ARGENTINA: Buenos Aires: Descole 2063 (N); Fabris 3241 (N); O'Donell 1424 (N); Rodrigues Vaquero 721 (N), 794 (N), 838 (N); Ruíz Huidobro 1330 (N). Chaco: R. M. Aguilar 29 (N), 1090 (N),

1306 (N). Corrientes: Burkart 19469 (W—2567996); Ibarrola 1283 (N); Krapovickas & Cristóbal 15910 (Ld); Krapovickas, Cristóbal, Arbo, Benitez, Maruñak, Maruñak, Pire, & Tressens 18053 (Ld); Krapovickas, Fernández, Mroginski, Bissio, & Quarin 19932 (Ld); Ruíz Huidobro 3742 (N); G. J. Schwarz 119 (N), 156 (N). Entre Ríos: Pedersen 9176 (N). Formosa: I. Morel 3678 (N), 4207 (N). La Pampa: Fortuna 14 (N), 17 (N). Misiones: Montes 14663 (Ac, Ld, N); G. J. Schwarz 1059 (N), 6240 (N). San Luis: Varela 553 (N). SOUTH AFRICA: Transvaal: Dahlstrand 178 (Go). IRAQ: Sayid Akmad 113 (N, W—2437672). PAKISTAN: Lahore: Sultan-ul-Abedin 2643 (N). THAILAND: Surapat 41 (W—2450873). CULTIVATED: Dominican Republic: Lavastre 2219 (N). Honduras: Molina R. 25401 (N). Iraq: Selman 405 (N). New Zealand: W. R. Sykes 543/65 (Nz—156225a). Pennsylvania: H. N. Moldenke 14570 (Se—146537). Utah: Reimschussel s.n. [October 28, 1964] (N).

VERBENA TENUISECTA var. ALBA Moldenke

Additional synonymy: Verbena laciniata var. alba Barker ex Moldenke, Fifth Summ. 2: 678, in syn. 1971.

Additional bibliography: Greene & Blomquist, Fls. South 108. 1953; Harler, Gard. Plains, ed. 4, 23, 24, 29, 238, & 250. 1962; Grimm, Recog. Flow. Wild Pl. 228. 1968; Hocking, Excerpt. Bot. A. 13: 571. 1968; Moldenke, Phytologia 16: 210. 1968; Moldenke, Résumé Suppl. 16: 2 (1968) and 17: 2 & 12. 1968; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. 6:] 1877. 1970; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1317 & 1324. 1970; Long & Lakela, Fl. Trop. Fla. 741. 1971; Moldenke, Fifth Summ. 1: 25, 27, 31, 49, 60, 63, 77, 188, 203, & 372 (1971) and 2: 667, 668, 678, 700, & 921. 1971; Moldenke, Phytologia 23: 283. 1972.

Liogier reports that in the Dominican Republic he found only a few individuals of this variety intermixed with the population of normally colored individuals.

The "white verbena", "moss verbena", and "Verbena erinoides" discussed by Harler (1962) from the gardens of India are probably V. tenuisecta var. alba. She notes that the plant is useful there for bedding, tough enough to be walked on occasionally, is perennial, needs sun, and can be used in hanging baskets and in rockeries.

Additional citations: HISPANIOLA: Dominican Republic: Liogier 11911 (Ac). CULTIVATED: California: Mrs. M. L. Barker s.n. [May 1945] (Sd—36317).

VERBENA TENUISECTA var. GLABRATA Moldenke

Additional bibliography: Moldenke, Phytologia 13: 273. 1966; Reitz, Sellowia 22: 145. 1970; Moldenke, Fifth Summ. 1: 179 (1971) and 2: 700 & 921. 1971.

VERBENA TENUISECTA f. RUBELLA Moldenke

Synonymy: Verbena tenuisecta var. alba f. rubella Moldenke apud Hocking, Excerpt. Bot. A.13: 571, sphalm. 1968.

Bibliography: Greene & Blomquist, Fls. South 108. 1953; Grimm, Recog. Flow. Wild Pl. 228. 1968; Hocking, Excerpt. Bot. A.13: 571. 1968; Moldenke, Phytologia 16: 210. 1968; Moldenke, Résumé Suppl. 16: 2. 1968; Rickett, Wild Fls. U. S. 3 (2): 362. 1969; Long & Lakela, Fl. Trop. Fla. 741. 1971; Moldenke, Fifth Summ. 1: 63 (1971) and 2: 921 & 968. 1971.

The corollas are described as "rose" on Rodriguez 578, while Greene & Blomquist (1953), Grimm (1968), Rickett (1969), and Long & Lakela (1971) describe them as "pink". The plant has been encountered on the campos in Argentina.

Citations: ARIZONA: Cochise Co.: Moldenke & Moldenke 2033, in part (Rf—type). ARGENTINA: Misiones: Rodriguez 578 (W—2595166).

VERBENA TENUISPICATA Stapf

Additional bibliography: Patzak & Rech. in Rech., Fl. Iran. 43: 1 & 8. 1967; Moldenke, Phytologia 16: 210. 1968; Moldenke, Fifth Summ. 1: 267 (1971) and 2: 687 & 921. 1971.

Patzak & Rechinger (1967) reduce this species to synonymy under V. officinalis L.

VERBENA TESSMANNII Moldenke

Additional bibliography: J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 614 & 629—630. 1960; Angely, Fl. Anal. Paran., ed. 1, 573. 1965; Moldenke, Phytologia 11: 304—305. 1965; Moldenke, Fifth Summ. 1: 179 (1971) and 2: 921. 1971.

Macbride (1960) includes this species in his Flora of Peru and indicates that he does so on the basis of information published by me. However, I am unable to find anywhere in my publications or correspondence that I ever stated that V. tessmannii grows, either wild or cultivated, in Peru. As far as I know, it is endemic to the state of Paraná, Brazil.

VERBENA TEUCRIIFOLIA Mart. & Gal.

Emended synonymy: Verbena teucrifolia Mart. & Gal. ex Hocking, Excerpt. Bot. A.6: 91. 1963.

Additional & emended bibliography: Lewis & Oliv., Am. Journ. Bot. 48: [639]—641, fig. 12. 1961; Hocking, Excerpt. Bot. A.6: 91. 1963; Moldenke, Phytologia 16: 210—211. 1968; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl. 717. 1969; Gibson, Fieldiana Bot. 24 (9): 230 & 233. 1970; Moldenke, Fifth Summ. 1: 77 & 81 (1971) and 2: 668, 702, & 921. 1971; Moldenke, Phytologia 22: 461 (1972) and 23: 188 & 415. 1972.

Lewis & Oliver (1961) report the diploid chromosome number for this species to be 30. Recent collectors have found the plant growing on grassland salt flats, in subalpine meadows, in oak woods, in high altitude internal drainage basins, and in zacatal of Muhlenbergia quadridentata, often in black sandy loam soil. Gilbert encountered it as small plants between limestone fragments

in alpine meadows, while Beaman found it in small grassy meadows surrounded by Abies forests. Gibson (1970) calls it "verbena de monte" and describes it as "Inconspicuous plants, common in the region of Quezaltenango", Guatemala.

The corollas are described as having been "blue" on Rosas R. 805, "purple" on J. Rzedowski 1009, and "blue-violet" on Rebolledo Vélez s.n. [20.VIII.1967]. Material has been misidentified and distributed in some herbaria under the names V. ambrosifolia Rydb. and V. ambrosiifolia Rydb. On the other hand, the Galicia 17, distributed as V. teucriifolia, is actually V. ciliata Benth.

Additional citations: MEXICO: Federal District: H. Hernández s.n. [25/IV/1965] (Ld); Hitchcock & Stanford 7037 (Au—301092); J. Rzedowski 1009 (Ip). Hidalgo: Chávez O. s.n. [4.VIII.1963] (Ip). México: Cruz Cisneros 1403 (Ip); González Quintero 1148 (Ip), 1155 (Ip); Rebolledo Vélez s.n. [20.VIII.1967] (Mi). Michoacán: Beaman 4351 (W—2575719). Nuevo León: Beaman 2667 (Au—240758, Ca—1304588, W—2576001), 4460 (Ca—1304912, W—2575737); L. Gilbert 22 (Au—252411). Puebla: Barkley, Paxson, & Webster 2493 (Au—1232444); Beaman 4229 (W—2575614); Johnston & Davis s. n. [27 July 1947] (Au—278288). Veracruz: Beaman 2191 (Ca—1213637); Rosas R. 805 (Ld).

VERBENA TEUCRIIFOLIA var. COROLLULATA Perry

Additional bibliography: Moldenke, Phytologia 11: 481. 1965; Moldenke, Fifth Summ. 1: 77 (1971) and 2: 921. 1971.

VERBENA THYMOIDES Cham.

Additional synonymy: Glandularia thymoides Martínez-Crovetto, Bonplandia 2: 41, 51, 58, 65, & [68], hyponym. 1965.

Additional bibliography: J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 621. 1960; Angely, Fl. Anal. Paran., ed. 1, 573. 1965; Martínez-Crovetto, Bonplandia 2: 41, 51, 58, 65, & [68]. 1965; Moldenke, Phytologia 16: 211. 1968; Moldenke, Résumé Suppl. 16: 22. 1968; Angely, Fl. Anal. Fitogeogr. Est. S. Paulo, ed. 1, 4: 840 & xix, map 1395. 1970; Reitz, Sellowia 22: 145. 1970; Moldenke, Fifth Summ. 1: 179, 188, 190, & 203 (1971) and 2: 522, 702, & 921. 1971; Moldenke, Phytologia 22: 465 (1972) and 23: 191. 1972.

Hatschbach encountered this plant on "campo, orla da capão". The corollas are described as having been "lilac" in color on Hatschbach 22310. The Krapovickas & Cristóbal 16028 and Krapovickas & al. 17113, distributed as V. thymoides, are both actually V. balansae Briq.

Additional citations: BRAZIL: Paraná: Hatschbach 22310 (Mi, N).

VERBENA THYMOIDES f. ALBIFLORA Moldenke

Additional bibliography: Moldenke, Phytologia 11: 312—314. 1965; Moldenke, Fifth Summ. 1: 190 (1971) and 2: 781 & 92. 1971.

VERBENA TOMOPHYLLA Briq.

Additional bibliography: Moldenke, Phytologia 11: 314—315. 1965; Moldenke, Fifth Summ. 1: 188 & 203 (1971) and 2: 677 & 921. 1971.

This species has been collected in fruit in October.

Additional citations: ARGENTINA: Formosa: I. Morel 3750 (N).

xVERBENA TORPA Moldenke

Additional bibliography: Moldenke, Phytologia 11: 481. 1965; Moldenke, Fifth Summ. 1: 373 (1971) and 2: 685, 705, & 921. 1971.

VERBENA TOWNSENDII Svenson

Synonymy: Verbena townsendi Svenson ex Moldenke, Phytologia 23: 293. 1972.

Additional bibliography: Moldenke, Phytologia 11: 316—317 (1965) and 16: 342. 1968; Moldenke in Wiggins & Porter, Fl. Galáp. Isls. 503, 506, & 509. 1971; Moldenke, Fifth Summ. 1: 138 (1971) and 2: 921. 1971; Wiggins & Porter, Fl. Galáp. Isls. 45 & 997. 1971; Moldenke, Phytologia 23: 293 & 437. 1972.

VERBENA TRACHEA R. A. Phil.

Additional bibliography: Reiche & Phil., Fl. Chil. 5: 289 & 292. 1910; Moldenke, Phytologia 11: 317—318. 1965; Moldenke, Fifth Summ. 1: 193 (1971) and 2: 703 & 921. 1971.

xVERBENA TRANSITORIA Moldenke

Additional bibliography: Moldenke, Phytologia 11: 481. 1965; Moldenke, Fifth Summ. 1: 373 (1971) and 2: 521, 678, 683, 700, & 921. 1971.

VERBENA TRIFIDA H.B.K.

Emended synonymy: Verbena trifida Humb. & Bonpl. ex Steud., Nom. Bot. Phan., ed. 1, 874. 1821.

Additional & emended bibliography: Steud., Nom. Bot. Phan., ed. 1, 874. 1821; J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 614, 618, & 630. 1960; Moldenke, Phytologia 16: 211. 1968; Moldenke, Fifth Summ. 1: 77, 120, & 373 (1971) and 2: 703 & 921. 1971; Moldenke, Phytologia 23: 191 & 370 (1972) and 24: 46. 1972.

Macbride (1960) incorrectly dates the original publication of this species as "1818", but as has been explained previously in this series of notes, the folio edition of the volume in question was issued in 1817. He records the species as doubtfully from Peru, with the note "Not seen by Perry, nor placed. Weberbauer 2723 was referred here by Hayek perhaps correctly, but this, typically at least, has leaves with only three narrow lobes; the type came from Mexico." I know V. trifida in its typical form only from Boyacá and Cundinamarca, Colombia. Material has been misidentified and distributed in some herbaria as V. microphylla H.B.K.!

Additional citations: COLOMBIA: Department undetermined: Mutis 3691 (W—1562720).

VERBENA TRIFIDA var. DESERTICOLA Moldenke

Additional bibliography: Moldenke, Phytologia 11: 320. 1965; Moldenke, Fifth Summ. 1: 193 (1971) and 2: 921. 1971.

xVERBENA TRINITENSIS Moldenke

Additional bibliography: Moldenke, Phytologia 16: 211--212. 1968; Moldenke, Fifth Summ. 1: 188 (1971) and 2: 657, 662, 677, 689, 700, & 921. 1971; Moldenke, Phytologia 22: 491 (1972) and 23: 279. 1972.

VERBENA TRISTACHYA Troncoso & Burkart

Additional bibliography: Moldenke, Phytologia 16: 212. 1968; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl. 715. 1969; Moldenke, Fifth Summ. 1: 203 (1971) and 2: 522, 700, & 921. 1971; Moldenke, Phytologia 23: 419. 1972.

Schnack & Covas (1951) report the diploid chromosome number for this species as 10. The plant has been collected in flower and fruit in September.

Additional citations: ARGENTINA: Misiones: G. J. Schwarz 6210 (N).

VERBENA TRITERNATA R. A. Phil.

Additional bibliography: Moldenke, Phytologia 11: 324--325. 1965; Moldenke, Fifth Summ. 1: 193 (1971) and 2: 654 & 921. 1971.

VERBENA TUMIDULA Perry

Additional bibliography: Moldenke, Phytologia 13: 274. 1966; Rickett, Wild Fls. U. S. 3 (2): 364. 1969; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1877. 1970; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. 6:] 1316 & 1324. 1970; Moldenke, Fifth Summ. 1: 60, 62, & 77 (1971) and 2: 921. 1971.

Rickett (1969) describes this plant as follows: "V. tumidula has hairy stems. The leaves, an inch long or longer, are cleft into three lobes which are coarsely toothed or scalloped or again cleft unevenly; they have short hairs on the under side. The fringed bracts are no longer than the calyx, which is glandular and hairy. The corolla is purplish-blue, 1/3 — 2/5 inch across. May to November: on the Edwards Plateau and in western Texas, and in New Mexico." It is, of course, the fruit character which alone can be depended on to distinguish this species. Johnston describes it as an erect plant and found it growing in gravelly moist places, flowering and fruiting in September.

Additional citations: MEXICO: Coahuila: I. M. Johnston 9252 (Au--300491).

VERBENA URTICIFOLIA L.

Additional synonymy: Verbena urticae-folia canadensis Tourn., Compl. Herb. 358. 1719. Verbena diffusa Desf. ex Steud., Nom. Bot. Phan., ed. 1, 873. 1821. Verbena urticiefolia L. apud S. W. Bailey, Barth. Cobble Fl. n.p. 1957.

Additional & emended bibliography: Tourn., Compl. Herb. 358.

1719; Crantz, Inst. Rei Herb. 1: 573. 1766; [Retz.], Nom. Bot. 11. 1772; J. F. Gmel. in L., Syst. Nat., ed. 13, pr. 1, 2: 42 (1789) and pr. 2, 2: 42. 1796; Balbis, Cat. Stirp. Hort. Acad. Taur. 80. 1813; Pers., Sp. Pl. 3: 347. 1819; Steud., Nom. Bot. Phan., ed. 1, 873 & 874. 1821; Jan, Elench. Pl. 1. 1824; Beck, Bot., ed. 1, 284. 1833; A. Wood, Class-book, ed. 1, 269 (1845), ed. 2, pr. 1, 412 (1847), ed. 2, pr. 2, 412 (1848), and ed. 10, pr. 1, 412. 1848; Beck, Bot., ed. 2, pr. 1, 285. 1848; A. Gray, Man. Bot., ed. 1, 311--312. 1848; A. Wood, Class-book, ed. 10, pr. 2, 412 (1849), ed. 10, pr. 3, 412 (1850), ed. 17, 412 (1851), ed. 23, 412 (1851), ed. 29, 412 (1853), ed. 35, 412 (1854), ed. 41, pr. 1, 412 (1855), and ed. 41, pr. 2, 412. 1856; Beck, Bot., ed. 2, pr. 2, 285. 1856; A. Gray, Man. Bot., ed. 2, pr. 1, 298 (1856), ed. 2, pr. 2, 298 (1858), and ed. 2, pr. 3, 298. 1859; A. Wood, Class-book, [ed. 42], pr. 1, 537. 1861; A. Gray, Man. Bot., ed. 3, 298 (1862) and ed. 4, pr. 1, 298. 1863; A. Wood, Class-book, [ed. 42], pr. 2, 537. 1863; A. Gray, Man. Bot., ed. 4, pr. 2, 298. 1864; A. Wood, Class-book, [ed. 42], pr. 3, 537. 1865; Darby, Bot. South. States 474. 1866; A. Wood, Class-book, [ed. 42], pr. 4, 537. 1867; A. Gray, Man. Bot., ed. 5, pr. 1, 340 (1867) and ed. 5, pr. 2, 340. 1868; Beck, Bot., ed. 2, pr. 3, 285. 1868; A. Wood, Class-book, [ed. 42], pr. 5, 537. 1868; A. Gray, Field For. & Gard. Bot., ed. 1, pr. 1, 242 (1868) and ed. 1, pr. 2, 242. 1869; A. Wood, Class-book, [ed. 42], pr. 6, 537 (1869) and [ed. 42], pr. 7, 537. 1870; A. Gray, Man. Bot., ed. 4, pr. 3, 298. 1870; A. Wood, Am. Bot. & Flor., ed. 1, pr. 1, 236 (1870), ed. 1, pr. 2, 236 (1871), and ed. 1, pr. 3, 236. 1872; A. Wood, Class-book, [ed. 42], pr. 8, 537. 1872; A. Wood, Am. Bot. & Flor., ed. 1, pr. 4, 236 (1873), ed. 1, pr. 5, 236 (1874), and ed. 1, pr. 6, 236. 1875; A. Wood, Class-book, [ed. 42], pr. 9, 537. 1876; A. Gray, Man. Bot., ed. 5, pr. 8, 340 (1878) and ed. 5, pr. 8 [9], 340. 1880; A. Gray, Field For. & Gard. Bot., ed. 1, pr. 3, 242. 1880; A. Wood, Class-book, [ed. 42], pr. 10, 537. 1881; Meyncke, Bull. Brooksville Soc. Nat. Hist. 1: [Fl. Franklin Co.] 31. 1885; O. R. Willis in A. Wood, Am. Bot. & Flor., ed. 2, 235. 1889; S. Wats. & Coult. in A. Gray, Man. Bot., ed. 6, pr. 1, 402 (1889) and ed. 6, pr. 2, 402. 1890; Gattinger, Med. Pl. Tenn. 63. 1894; L. H. Bailey in A. Gray, Field For. & Gard. Bot., ed. 2, 341. 1895; W. A. Wheeler, Minn. Bot. Stud. 2: 403. 1900; H. Kraemer, Text-book Bot. & Pharmacog., ed. 1, 368 (1902), ed. 2, 368 (1907), ed. 3, 368 (1908), and ed. 4, 368. 1910; Graves, Eames, Bissell, Andrews, Harger, & Weatherby, Bull. Conn. Geol. & Nat. Hist. Surv. 14: [Cat. Flow. Pl.] 331. 1910; Britton & Br., Illustr. Fl., ed. 2, pr. 1, 3: 94 & 95, fig. 3553. 1913; Shull, Pl. World 17: 333, 335, & 336. 1914; Harshberger, Veg. N. J. Pine Barrens, pr. 1, 206, 254, & 257. 1916; Lowe, Miss. State Geol. Surv. Bull. 17: 236. 1921; Pammel & King, Iowa Geol. Surv. Bull. 4 (rev.): 264--267, fig. 151, 161A, & 151B. 1926; G. Klein, Handb. Pflanzenanal. 3 (2): 1238. 1932; Sefferien, Torreya 32: 125. 1932; Britton & Br., Illustr. Fl., ed. 2, pr. 2, 3: 94 & 95, fig. 3553. 1936; Noack, Biol. Zentralbl. 57: 384 & 386, fig. 4. 1937; F. H. & H. H. Hillman, Seed Trade Buyers Guide 1938: 137, pl. 12, fig. 5. 1938; Britton & Br., Illustr. Fl.,

ed. 2, pr. 3, 3: 94 & 95, fig. 3553. 1943; Zufall & Richtm., Pharm. Arch. 15: 1--9. 1944; Zufall & Richtm., Chem. Abstr. 38: 4092. 1944; Savage, Cat. Linn. Herb. Lond. 4. 1945; Britton & Br., Illustr. Fl., ed. 2, pr. 4, 3: 94 & 95, fig. 3553. 1947; E. L. Palmer, Fieldbook Nat. Hist., ed. 1, pr. 3, 297 & 663. 1949; Abrams, Illustr. Fl. Pacif. States, pr. 1, 3: 611. 1951; Fogg, Weeds Lawn & Gard. 141. 1956; S. W. Bailey, Barth. Cobble Fl. n.p. 1957; Jacobs & Burlage, Ind. Pl. N. C. 221--222 & 251. 1958; R. McVaugh, Bull. N. Y. State Mus. 360: 196. 1958; F. Bartley in J. C. Bartley, Bull. Ohio Biol. Surv., new ser., 1: 181. 1959; Winter, Winter, & Van Bruggen, Check List Vasc. Pl. S. D. 124. 1959; Ferris in Abrams & Ferris, Illustr. Fl. Pacif. States, pr. 1, 4: 730. 1960; J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 626. 1960; Rattenbury, Madroño 15: 220. 1960; Lewis & Oliv., Am. Journ. Bot. 48: [639]--641, fig. 21. 1961; Poindexter, Trans. Kans. Acad. Sci. 65: 409, 410, 412, 413, & 415--419, fig. 1, 2, 5, & 6. 1962; Dobbs, Fl. Henry Co. 229. 1963; Hocking, Excerpt. Bot. A.6: 91. 1963; Newcomb, Pocket Key Comm. Wild Fls. 24. 1963; Radford, Ahles, & Bell, Guide Vasc. Fl. Carol. 281 & 282. 1964; Rouleau in Marie-Victorin, Fl. Laurent., ed. 2, 489 & 490, fig. 170. 1964; Hocking, Excerpt. Bot. A.7: 206 (1964), A.8: 537 (1965), and A.9: 366 & 367. 1965; Ferris in Abrams & Ferris, Illustr. Fl. Pacif. States, pr. 2, 4: 730. 1965; H. S. Fitch, Univ. Kans. Nat. Hist. Reserv. 49. 1965; Lakela, Fl. Northeast. Minn. 110. 1965; Hirata, Host Range & Geogr. Distrib. Powd. Mild. 277. 1966; Mohlenbrock, Castanea 31: 224 & 235. 1966; F. H. Montgomery, Plants from Sea to Sea 262. 1966; Thornberry, U. S. Dept. Agr. Agric. Handb. 165: 479. 1966; Abrams, Illustr. Fl. Pacif. States, pr. 2, 3: 611. 1967; Rendle, Classif. Flow. Pl., ed. 2, 2: 502, fig. 230. 1967; Shinn, Univ. Kans. Sci. Bull. 46: 790, 791, 886, 887, & 928. 1967; Wherry, Bartonia 37: 13. 1967; Zukowski in Paelowskiego, Fl. Polsk. 11: 65. 1967; Boivin, Phytologia 16: 39. 1968; Boivin, Provanch. 2: 194. 1968; Burlage, Ind. Pl. Tex. 184, 206, 225, & 237. 1968; Freer, Castanea 33: 185. 1968; W. C. Grimm, Recog. Flow. Wild Pl. 228. 1968; Gunn, Castanea 33: 102. 1968; Mohlenbrock, Trans. Ill. Acad. Sci. 61: 71. 1968; Moldenke, Phytologia 16: 212--214 & 340. 1968; Moldenke, Résumé Suppl. 16: 1, 7, & 28 (1968) and 17: [1]. 1968; Paterson & McKenny, Field Guide Wildfls. 62, [63], & 418. 1968; Streams, Shahjahan, & Le Masurier, Journ. Econ. Ent. 61: 997. 1968; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl. 717. 1969; Cody, Ind. Sem. Bot. Gard. Ottawa 1969: 22. 1969; Farnsworth, Blomster, Quimby, & Schermerh., Lynn Index 6: 262 & 267. 1969; Hocking, Excerpt. Bot. A.14: 206. 1969; C. E. O. Hopkins, Castanea 34: 179. 1969; W. E. Hopkins, Castanea 34: 46. 1969; Jervis, Castanea 34: 115. 1969; Lowden, Ohio Journ. Sci. 69: 280. 1969; Moldenke, Biol. Abstr. 50: 418. 1969; A. L. Moldenke, Phytologia 18: 126 & 127. 1969; Rickett, Wild Fls. U. S. 3 (2): 365. 1969; C. L. Rodgers, Castanea 34: 390. 1969; F. C. Seymour, Fl. New Eng. 456. 1969; Swink, Pl. Chicago Reg. 428. 1969; Beaman, Mich. Bot. 9: 158. 1970; G. H. & J. C. Bick, Entomol. News 81: 158, 159, & 163. 1970; Britton & Br., Illustr. Fl., ed. 2, pr. 5, 3: 94 & 95, fig.

3553. 1970; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1877. 1970; Domville & Dunbar, John Burroughs Nat. Hist. Soc. Bull. 8: 95. 1970; DuMond, Castanea 35: 237. 1970; Harrington in Frankel & Bennett, Genetic Resources 516. 1970; Harshberger, Veg. N. J. Pine Barrens, pr. 2, 206, 254, & 257. 1970; Joyal, Natur. Canad. 97: 561 & 577. 1970; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1314 & 1319. 1970; W. R. Weber, Trans. Ill. Acad. Sci. 63: 25. 1970; Bostick, Castanea 36: 206. 1971; Brown & Wherry, Bartonia 40: 13. 1971; Cochrane, W. E. Rice, & M. M. Rice, Mich. Bot. 10: 184. 1971; Cody, Ind. Sem. Bot. Gard. Ottawa 1971: 20. 1971; Farnsworth, Pharmacog. Titles 5, Cumul. Gen. Ind. 1971; Moldenke, Fifth Summ. 1: 14—23, 25, 27, 31—35, 37—42, 44, 46, 47, 49, 52, 54, 60, 204, & 373 (1971) and 2: 656, 659, 666, 668, 669, 673, 674, 677, 679, 685, 689, 692, 696, 698, 701, 704—706, 709, 773, 782, & 921. 1971; Moldenke in Wiggins & Porter, Fl. Galáp. Isls. 508. 1971; H. V. Sm., Mich. Bot. 10: 198 & 201. 1971; Stalter, Castanea 36: 174. 1971; Thilenius, U. S. Dept. Agr. Forest Serv. Res. Pap. RM.71: 42. 1971; Wiggins & Porter, Fl. Galáp. Isls. 997. 1971; Cody, Ind. Sem. Bot. Gard. Ottawa 1972: 25. 1972; Moldenke, Phytologia 23: 185, 225, 229, 265, 303, 370, & 413 (1972) and 24: 33. 1972; Tucker, Castanea 37: 23. 1972.

Additional illustrations: Britton & Br., Illustr. Fl., ed. 2, pr. 1, 3: 95, fig. 3553. 1913; Pammel & King, Iowa Geol. Surv. Bull. 4 (rev.): 265 & 266, fig. 151 & 151A. 1926; Britton & Br., Illustr. Fl., ed. 2, pr. 2, 3: 95, fig. 3553. 1936; Noack, Biol. Zentralbl. 57: 386, fig. 4. 1937; F. H. & H. H. Hillman, Seed Trade Buyers Guide 1938: 137, pl. 12, fig. 5. 1938; Britton & Br., Illustr. Fl., ed. 2, pr. 3, 3: 95, fig. 3553 (1943) and ed. 2, pr. 4, 3: 95, fig. 3553. 1947; Fogg, Weeds Lawn & Gard. 141. 1956; Rouleau in Marie-Victorin, Fl. Laurent., ed. 2, 489, fig. 170. 1964; Rendle, Classif. Flow. Pl., ed. 2, 2: 502, fig. 230. 1967; Paterson & McKenny, Field Guide Wildfls. [63]. 1968; Britton & Br., Illustr. Fl., ed. 2, pr. 5, 3: 95, fig. 3553. 1970; H. V. Sm., Mich. Bot. 10: 201. 1971.

Savage (1945) reports that in the Linnean Herbarium in London sheet number 13, under genus 35, Verbena, is inscribed "urticifolia 11", the specific epithet being in Linnaeus' own handwriting.

Recent collectors have found the plant growing in alluvial or dry upland woods, on granitic outcrops and bushy uplands, in dry alluvial sandy soil, on floodplains, and in shady places. Rowell reports that it is an occasional herb in the dense shade of Diospyros groves in Hemphill County, Texas. Grimm (1968) says of it: "This plant is similar to the preceding one [V. hastata] but it has more lax end clusters of small white flowers. It grows in fields, thickets, and the borders of woods from Que. to Ont. and S. D. south to Fla. and Tex." Bartley (1959) records it from Jackson County, Ohio, Cochrane (1971) from woods, thickets, and roadsides in Rock County, Wisconsin, and Dobbs (1963) from Henry County, Illinois, where he says it is "frequent to common on the borders of woodlands, also in pasture fields and waste places". Domville &

Dunbar (1970) describe it as frequent in wet pastures in Ulster County, New York, where it blooms in the "summer"; Freer (1968) cites Freer 7149 from Amherst County and Freer 7207 from Rockbridge County, Virginia; Gunn (1968) records it from Bullett County, Kentucky; Hopkins (1969) cites W. E. Hopkins 1022 from Pope County, Illinois; and Joyal (1970) cites Joyal 1231 from Soeur Island, Québec. Gattinger (1894) says of it "Flower-spike and flowers very much like the former [V. officinalis], but more robust and taller, 3—5° high; leaves oval or oblong-ovate, acute, coarsely serrate, petioled; spikes at length much elongated, loosely panicled; flowers very small, white. A homely weed, everywhere along roadsides or open grounds" in Tennessee. For medicinal usage, he says, "Collect the root."

Lakela (1965) avers that V. urticifolia is recorded for northeastern Minnesota only on the basis of "coll of Jol8597 Ely". Lowden (1969) records it from Squaw Island, Ohio; Lowe (1921) says that it is "A common weed in waste places" in Hinds, Lafayette, Oktibbeha, Union, and Warren Counties, Mississippi; Mohlenbrock (1968) lists it from Pope County, Illinois; while Radford, Ahles, & Bell (1964) tell us that it occurs in marshes, mesic woodlands, old fields, and waste places throughout the Carolinas, blooming there from May to November. They do not recognize var. leiocarpa Perry & Fern.

Stalter (1971) has reported V. urticifolia from Georgetown County, South Carolina, Tucker (1972) from Ashe County, North Carolina, Weber (1970) from Randolph County, Illinois, and Wherry (1967) from Delaware County, Pennsylvania. Swink (1969) says that it is found in the Chicago area "In degraded woodland, with Aster sagittifolius drummondii, Carya cordiformis, Circaea quadrisulcata canadensis, Cornus racemosa, Eupatorium rugosum, Parthenocissus quinquefolia, Phlox divaricata, Prunus serotina, Quercus alba, Quercus macrocarpa, Quercus rubra, Tilia americana, Ulmus americana, and Vitis riparia. It is found on shaded flood plains, with Actinomeris alternifolia, Impatiens capensis, Laportea canadensis, Rudbeckia laciniata, and Silphium perfoliatum. Along old logging roads, and in other artificial shaded habitats, it is found with Amphicarpa bracteata, Cirsium vulgare, Dioscorea villosa, Erigeron annuus, Fragaria virginiana, Oxalis stricta, Phytolacca americana, Silene stellata, and Solidago altissima." Tatnall (1946) reports it as "frequent in thickets and waste places, chiefly on Piedmont, occasional on Coastal Plain" of Delaware, citing Earle 1734 & 3112 and Tatnall 1519; Wheeler (1900) cites W. A. Wheeler 406 & 548 from Jefferson, Minnesota; Winter and his associates (1959) aver that it grows in "Thickets and waste places over the state" of South Dakota, while Wunderlin (1966) reports it as only local in open ground in Carroll County, Illinois, citing Wunderlin 136. Rouleau (1964) states that in Québec it is found only in the western portion of the province.

The corolla is described as having been "white" on C. A. Brown

2650, B. Hutchins 1321, and Whitehouse 16426, but as "blue" on R. Runyon 1260 (probably an error in recollection by the collector, since the collection certainly does not represent the blue-flowered hybrid often found where V. urticifolia grows in proximity to V. hastata L.) The illustration given by Smith (1971) shows the plant in its winter condition. Harrington (1970) reports that its seeds have a life span of 39 years. Shull (1914) kept seeds in mud covered by several inches of water for 4 1/2 years in a dark attic where the temperature seldom dropped below freezing; upon draining the water, the seeds germinated readily in a greenhouse.

Glucoside is reported from the tissues of V. urticifolia by Zufall & Richtman (1944), while Burlage (1968) reports that the plant has been used with Quercus alba to treat Toxicodendron poisoning and that it was used by the Amerinds as a diuretic and emmenagogue.

Thornberry (1966) records the following fungi as attacking V. urticifolia: Erysiphe cichoriacearum P. DC. (a powdery mildew, also reported by Hirata, 1966), general through its range, Puccinia vilfae Arth. & Holw. (a rust) from Indiana to Oklahoma and South Dakota, Septoria verbenae Rob. (a leaf-spot) from Vermont to Mississippi, Texas, and South Dakota, and an unidentified virus forming a mosaic in Iowa.

Patermann (1935) records the diploid chromosome number as 12, but Junell (1934), Dermen (1936), Noack (1937), Lewis & Oliver (1961), and Poindexter (1962) give it as 14. An additional common name for the species recorded in old literature is "nettle-leaved vervain of Canada".

The Bicks (1970) report that a dragonfly, Archilestes grandis, has been observed depositing her eggs on the stems of V. urticifolia as far as "2.3 m. above water" [meaning, I assume, the water-line of the stream or pond margin]. Streams and his associates (1968) report that the nymphs of the tarnished plant bug often infest Verbena urticifolia as well as V. hastata, Erigeron annuus, E. strigosus, Oenothera biennis, Daucus carota, and Solidago spp., and are there parasitized by the wasp, Leiophron pallipes Curtis, which provides biologic control of the bug which would otherwise spread from weeds to cultivated crops.

Those who regard this vervain as an undesirable "weed" are assured by Pammel & King (1926) that it can easily be destroyed by cutting. Fogg (1956) describes it interestingly as follows: "Although seemingly at home in thickets and woodland borders, White Vervain is a common species of roadsides, meadows, fields, and waste places. In poor soils it may occur as a weak, scrawny plant with only a single stem, but in more favorable situations it often develops to a height of four or five feet and becomes so profusely branched as to be almost shrub-like. In either case it is easy to recognize by virtue of its opposite, coarsely toothed, and conspicuously veined leaves which so much resemble those of certain nettles as to have suggested the specific name urticaefolia given to it by the Swedish botanist Linnaeus. The small white flowers

of this species are borne in numerous long, slender spikes, and each flower is capable of producing four minute seeds or nutlets. The plant has a period of bloom extending over at least three months, and the apex of the stem continues to produce new buds long after the lowest flowers have withered and liberated their seeds. It therefore behooves those whose gardens this species has invaded to learn to recognize it early in the season and to lose no time in effecting its removal. Like most species with perennial roots, it should be attacked when the earth is soft."

As mentioned previously in this series of notes, there are several more or less distinct forms or races of this plant: the one characterized by having coarse (not short) hairs over the entire under surface of the leaf lamina is well represented by B. Hutchins 1321, cited below, while the form with the coarse hairs only on the venation of the lower surface is well represented by Roop 77, C. M. Rowell 5563 & 10723, and Stratton 1619, also cited below.

The Schnée s.n. [Mexique, VI.X], distributed as V. urticifolia, is actually V. ehrenbergiana Schau., M. E. Wharton 5633a is xV. engelmannii Moldenke, J. T. Stewart 13861 is xV. perriana Moldenke, M. E. Wharton 5186a is V. urticifolia var. leiocarpa Perry & Fernald, and Andreasen, Davis, & Luikart 40 is Perilla frutescens (L.) Britton in the Lamiaceae.

Additional citations: QUÉBEC: Huntingdon Co.: Ernest & Le Blanc 61-230 (Go). VERMONT: Chittenden Co.: S. F. Blake 2119 [Herb. Blake 3221] (Ld). NEW YORK: Bronx Co.: Collector undetermined s.n. [William's Bridge, 8.9.77] (N). Dutchess Co.: Hyde & Hyde 180 (Go), 275 (Go), 312 (Rf). Seneca Co.: Chickering s.n. [Ovid, July 1858] (W—2605972). NEW JERSEY: Camden Co.: Day s.n. [Stratford, Aug. 20, 1871] (Pa). Union Co.: A. L. Moldenke s.n. [July 12, 1968] (Ps—120); H. N. Moldenke 24476 (Go, Lk, Mu), 24903 (Lk, Mu); Moldenke & Moldenke 24476 (Ft, Ip, Tk, Ws, Ws), 24903 (Au, Go, Ip, L, Ws, Ws). PENNSYLVANIA: Centre Co.: C. G. Shaw s.n. [7/18/39] (Se—115998). DELAWARE: New Castle Co.: Canby s.n. (Pa). DISTRICT OF COLUMBIA: Sudworth 603 (Mi). NORTH CAROLINA: Jones Co.: Radford 37095 (N). Yadkin Co.: B. King s.n. [Radford 44917] (W—2499792). SOUTH CAROLINA: Lancaster Co.: Ahles & Haesloop 31241 (Se—199294). ALABAMA: Jefferson Co.: E. L. Reed 1539 (Lk). OHIO: Butler Co.: Cobbe 144 (Go); M. Miller s.n. [July 7, 1932] (Go). ILLINOIS: Cook Co.: H. R. Bennett s.n. [August 17, 1957] (Se—180352), s.n. [August 31, 1957] (Se—180361). Parke Co.: Daubenmire s.n. [July 11, 1930] (Se—177666), s.n. [July 26, 1930] (Se—181531). Tazewell Co.: V. H. Chase 3228 (N, Se—180435, Se—204859). Woodford Co.: V. H. Chase 9991 (Au—122809, Au—122810). INDIANA: Fulton Co.: Friesner 23098 (Au—122812). KENTUCKY: Bath Co.: M. E. Wharton 3174 (Mi). Boyd

Co.: M. E. Wharton 2919 (Mi). Estill Co.: M. E. Wharton 3010b (Mi). Henry Co.: J. L. Gentry Jr. 363 (N). Madison Co.: M. E. Wharton 835 (Mi). Montgomery Co.: M. E. Wharton 3076 (Mi). MICHIGAN: Cass Co.: H. R. Bennett 2706 (W—2445851). Clinton Co.: C. A. Brown 2650 (N). WISCONSIN: Brown Co.: Castelnau s.n. [G. de Baie Verte] (W—2546793). MINNESOTA: Murray Co.: Jensen-Haarup s.n. [Slayton, summer 1913] (Ac). KANSAS: Atchison Co.: Horr & McGregor E.531 (N). MISSOURI: Reynolds Co.: Evans, Sharp, Morton, Delgadillo, Furr, & Bowers 42566 (N). Saint Louis: Muehlenbach 3129 (Ac), 3204 (Ac). ARKANSAS: Garland Co.: Demaree 59636 (Ac), 60535 (Ac). Hot Spring Co.: Demaree 17887 (Se—200354). Pope Co.: Demaree 58426 (Rf). Sharp Co.: Demaree 26273 (Au—122813). Stone Co.: Demaree 59189 (Rf), 61029 (Ac). NEBRASKA: Jefferson Co.: Rohrbaugh 167 (Au—122811). OKLAHOMA: Comanche Co.: E. J. Palmer 11749 (N), 11749b (N). McCurtain Co.: C. M. Rowell 10723 (Lk). Osage Co.: Stratton 1619 (Lk). Payne Co.: Roop 77 (Lk). TEXAS: Denton Co.: Whitehouse 16426 (N). Hemphill Co.: C. M. Rowell 5563 (Lk, Lk). Wheeler Co.: B. Hutchins 1321 (Lk). LOCALITY OF COLLECTION UNDETERMINED: Day s.n. [Hudson R. Railroad, Aug. 1872] (Pa); Lesueur s.n. [Amer. sept.] (W—2546791).

VERBENA URTICIFOLIA var. INCARNATA (Raf.) Moldenke

Additional bibliography: Moldenke, Phytologia 13: 275. 1966; Moldenke, Fifth Summ. 1: 19 (1971) and 2: 677 & 921. 1971.

It is possible that the Correll & Mitchell 34397, cited herein under V. urticifolia var. leiocarpa Perry & Fernald, with "light-lavender" corollas, may represent var. incarnata instead.

VERBENA URTICIFOLIA var. LEIOCARPA Perry & Fernald

Additional synonymy: Verbena urticifolia var. leiocarpa Perry ex Moldenke, Fifth Summ. 2: 705, in syn. 1971.

Additional bibliography: Wherry, Bartonia 37: 13. 1967; Burlage, Ind. Pl. Tex. 184. 1968; Moldenke, Phytologia 16: 214. 1968; F. C. Seymour, Fl. New Ebg. 456. 1969; Swink, Pl. Chicago Reg. 428. 1969; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1877. 1970; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1314 & 1319. 1970; Cochrane, W. E. Rice, & M. M. Rice, Mich. Bot. 10: 184. 1971; Moldenke, Fifth Summ. 1: 17—22, 24, 25, 31, 34, 37—42, 44, 46, 48, 52, 54, 60, & 373 (1971) and 2: 703—705 & 921. 1971.

Cochrane and his associates (1971) record this variety from along roadsides in Rock County, Wisconsin, citing Wickham s.n. [La Prairie, 1947] in the herbarium of the University of Wisconsin; Wherry (1967) records it from Delaware County, Pennsylvania, while Swink (1969) notes that "Var. leiocarpa occurs in our area [the Chicago region], but Jones & Fuller make it a synonym of the

type".

The corollas are said to have been "light-lavender" on Correll & Mitchell 34397, cited below, and, if this description is accurate, it is very possible that this collection by represent var. incarnata (Raf.) Moldenke instead.

Additional citations: DISTRICT OF COLUMBIA: Sudworth s.n. [19 June 1890] (Mi). KENTUCKY: Estill Co.: M. E. Wharton 5186a (Mi). MICHIGAN: Cass Co.: H. R. Bennett 2708 (W—2445853). ARKANSAS: Stone Co.: Demaree 59366 (Ac), 61208 (Rf). TEXAS: Red River Co.: Correll & Mitchell 34397 (Ld, Ld).

xVERBENA URUGUAYENSIS Moldenke

Additional bibliography: Moldenke, Phytologia 13: 275. 1960; G. Taylor, Ind. Kew. Suppl. 14: 142. 1970; Moldenke, Fifth Summ. 1: 190 (1971) and 2: 683, 689, 700, & 922. 1971.

xVERBENA VAGA Moldenke

Additional bibliography: Moldenke, Phytologia 16: 214. 1968; Solbrig, Passani, & Glass, Am. Journ. Bot. 55: 1239. 1968; Moldenke, Fifth Summ. 1: 203 & 373 (1971) and 2: 522, 683, 694, 705, 782, & 922. 1971.

VERBENA VALERIANOIDES H.B.K.

Emended synonymy: Verbena valerianoides Humb. & Bonpl. ex Steud., Nom. Bot. Phan., ed. 1, 874. 1821.

Additional & emended bibliography: Steud., Nom. Bot. Phan., ed. 1, 874. 1821; Moldenke, Phytologia 16: 214. 1968; Moldenke, Fifth Summ. 1: 120 (1971) and 2: 705 & 922. 1971.

VERBENA VARIABILIS Moldenke

Additional bibliography: J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 613 & 630. 1960; Moldenke, Phytologia 13: 275. 1966; Moldenke, Fifth Summ. 1: 144 (1971) and 2: 922. 1971.

VERBENA VENTURII Moldenke

Additional & emended bibliography: Hocking, Excerpt. Bot. A. 9: 367. 1965; Moldenke, Phytologia 13: 275. 1966; Moldenke, Fifth Summ. 1: 203 (1971) and 2: 922. 1971.

VERBENA VILLIFOLIA Hayek

Additional synonymy: Verbena villifolia "Hayek in Engl." ex Hocking, Excerpt. Bot. A.9: 367. 1965.

Additional bibliography: J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 613 & 614. 1960; Moldenke, Phytologia 13: 275. 1966; Moldenke, Fifth Summ. 1: 144 (1971) and 2: 706 & 922. 1971.

Additional citations: PERU: Junin: Hutchison & Tovar 4209 (N).

VERBENA WEBERBAUERI Hayek

Synonymy: Verbena weberbaueri "Hayek in Engl." ex Hocking, Excerpt. Bot. A.9: 367. 1965.

Additional bibliography: J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 613, 615, & 622. 1960; Moldenke, Phytologia 14: 292 & 301. 1967; Moldenke, Fifth Summ. 1: 144 & 184 (1971) and 2: 706 & 922. 1971.

xVERBENA WINGEI Moldenke

Additional & emended bibliography: Cain, Found. Pl. Geogr., pr. 1, 335. 1944; Moldenke, Phytologia 13: 275--276. 1966; Khoshoo & Arora, Chromosoma 26: [259]--269, fig. 3 & 7--15. 1969; Khoshoo & Arora, Biol. Abstr. 50: 10213. 1969; Cain, Found. Pl. Geogr., pr. 2, 335. 1971; Moldenke, Fifth Summ. 1: 373 (1971) and 2: 652, 658, 699, 700, & 922. 1971; Moldenke, Phytologia 23: 427. 1972.

Illustrations: Khoshoo & Arora, Chromosoma 26: 261 & 263--265, fig. 3 & 7--15. 1969.

Khoshoo & Arora (1969) tell us that "Both 6x Verbena aubletia (n = 15) and 2x V. temuisecta (n = 5) form bivalents during meiosis, however, their $4xF_1$ hybrid (V. aubletia x V. temuisecta) shows almost complete homoeologous pairing involving on [sic] average 19.74 out of its 20 chromosomes. In 10% cells there are 4IV + 2II indicating that essentially there may be 4 homoeologous sets of 5 chromosomes each in the F_1 hybrid. Evidently, V. aubletia is segmental allohexaploid involving 3 homoeologous genomes ($A_1A_1A_2A_2A_3A_3$). Whether its cytologically diploid behavior is the result of a multivalent suppressor system or due to an acute property of preferential pairing, cannot be answered with certainty. In either case intergenomal homologies are totally suppressed resulting in bivalent pairing, meiotic isolation of the 3 genomes and institution of normal fertility." Cain (1971) adds that "Certain species may differ by more than one character and still segregation of the factors are linked in chromosomes. Winge.....obtained both parental forms of the cross between Tragopogon pratensis and T. porrifolius in the F_2 and subsequent generations. Also from Verbena tenera x V. Aubletia it was possible to segregate the parental species in pure form." My son, Dr. Andrew R. Moldenke, tells me that all this indicates that V. canadensis is hexaploid (the gamete n = 15, somatic cells n = 30), while V. temuisecta is diploid (gamete n = 5, somatic cells n = 10) and the hybrid, xV. wingei, is octoploid (gamete n = 20, somatic cells n = 40), the base number (x) being 5, indicating their position in the subgenus Glandularia. At meiosis the hybrid is 4IV 2II; the fact that it isn't 5IV indicates that V. canadensis was a hybrid somewhere back in its evolutionary history between a diploid Glandularia n = 5(a') and an autopolyploid quadruploid Glandularia n = 10(a"). It also implies that V. temuisecta is more closely related to (if not actually the same as) the original Glandularia parent of V. canadensis (a') than to the other parent (a"). This is extremely interesting since V. temuisecta is regarded as now being native only in southern South America and V. canadensis in central North America.

VERBENA WRIGHTII A. Gray

Additional & emended bibliography: Whitehead, Torreya 33: 60.. 1933; Wyman & Harris, Univ. N. M. Bull. 388 (Anthrop. Ser. 3, 5): [Navajo Ind. Ethnobot.] 20, 45, & 47. 1941; Howell & McClintock in Kearney & Peebles, Ariz. Fl., ed. 2, 725 & 727. 1960; J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 612 & 613. 1960; Lewis & Oliv., Am. Journ. Bot. 48: [639]—641, fig. 5. 1961; Rattenbury, Madroño 16: 267. 1962; Turrill in Curtis, Bot. Mag. 174: pl. 409. 1963; Hocking, Excerpt. Bot. A.6: 91 (1963), A.9: 367 (1965), and A.12: 424. 1967; Moldenke, Phytologia 16: 214—215. 1968; Pace & Johnson, U. S. Dept. Agr. Forest Serv. Res. Paper RM.41: 18. 1968; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl. 717. 1969; Rickett, Wild Fls. U. S. 3 (2): 362 & [363], pl. 110. 1969; Synge, Suppl. Dict. Gard. 548. 1969; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1877. 1970; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1317 & 1325. 1970; Rickett, Wild Fls. U. S. 4 (3): 539, [541], & 799, pl. 176. 1970; Mahler, Key Vasc. Pl. Black Gap, ed. 3, 71. 1971; Moldenke, Fifth Summ. 1: 44, 51, 54, 60, 62, 64, 77, 248, & 373 (1971) and 2: 653, 654, 690, 708, & 922. 1971; Moldenke, Phytologia 22: 461 (1971), 23: 228 (1972), and 24: 51. 1972.

Additional illustrations: Rickett, Wild Fls. U. S. 3 (2): [363], pl. 110 (in color) (1969) and 4 (3): [541], pl. 176 (in color). 1970.

The haploid chromosome number for this species is reported by Solbrig (1962) as 10, based on Solbrig 3187 from Pecos County, Texas. Lewis & Oliver (1961) also report the same number. The Rattenbury (1962) reference in the bibliography given above is often credited to Solbrig.

Vernacular names reported for the species are "Arizona verbena", "desert verbena", and "Wright verbena". The color plate given by Turrill (1962) as representing V. wrightii is very plainly misidentified; it certainly depicts V. elegans var. asperata Perry instead!

Rickett (1969) describes V. wrightii as follows: "V. wrightii may have erect stems, which are sparsely hairy. The leaves may have a short stalk. The calyx is densely glandular. It grows from central Texas to Arizona and Colorado." Recent collectors describe it as decumbent or erect, the stem branched at the base, 3—4.5 dm. tall, the leaves "somewhat coarse", the flowers showy when in bloom, the petals narrow. The corolla is described as "bluish-lavender" on Spellenberg & Spellenberg 2250 and as "bluish-pink" on Solbrig 3187.

Recent collectors have found this species growing in shallow soils with rock or gravel, in deep sand dominated by mesquite and grasses, in limestone loam or rocky limestone loam, in limestone gravel and sandy loam of Larrea flats, in grassy valleys under oaks, at the margins of tobosa flats, on open silty deserts, and among foothills. Cory reports it frequent on road shoulders in Jeff Davis County, Texas; Howell & McClintock (1960) state that it is "rare" in Arizona; Pace & Johnson (1968) record it from Gila

County, Arizona; while Stanford, Retherford, & Northcraft aver that it is "common" among Larrea, Acacia, and herbaceous weeds in playa valleys with considerable drainage from surrounding hills in Coahuila, but their no. 241 has much the general aspect of V. ambrosifolia Rydb., at least insofar as the University of Texas specimen of that number is concerned.

The Dominguez & McCart 8263, J. S. Martin 933, M. D. McCracken 25, Norland s.n. [21 Aug. 1959], B. Pittman 39, J. Reed 28, Reséndez 79, Scholl 11, Spellenberg & Todsen 2543, and Youngblood 21, distributed as V. wrightii, are all actually V. ambrosifolia Rydb.; W. W. Jones s.n. [22 June 1962] & s.n. [23 July 1962], E. L. Reed 3943, Reséndez 78, and Studhalter & Camp 1105 are V. bipinnatifida Nutt.; C. F. Harbison 41178, N. H. Holmgren 3308, D. E. Howe s.n. [24 April 1966], Keil, Pinkava, & Lehto 9334, and Letcher s.n. [San Bernardino, March 31, 1929] are V. gooddingii Briq.; and L. M. Andrews 259a is V. gooddingii var. nepetifolia Tidestr.

Additional citations: COLORADO: Archuleta Co.: Weber & Livingston 6258 (Se—144902). TEXAS: Brewster Co.: Kruckeberg 4739 (Se—208448); C. H. Mueller 8140 (Lk). Ector Co.: T. Collins 60 (Lk, Lk), 91, in part (Lk). Hudspeth Co.: T. Wells s.n. [26 April 1968] (Lk). Jeff Davis Co.: Cory 52025 (Mi, N); Moore & Moore 2 (Se—119542); Tharp & Janszen 49-1141 (N). Pecos Co.: Solbrig 3187 (W—2607470). Presidio Co.: Carroll 15 (Lk). Reeves Co.: Canales 39 (Lk); Cory 52259 (Mi); Nelson & Nelson 4983 (Se—118763). County undetermined: C. R. Orcutt 6.1080 [western Texas] (Sd—23464). NEW MEXICO: Bernalillo Co.: Atwood 2563 (N). Dona Ana Co.: Spellenberg & Spellenberg 2250 (N). Eddy Co.: Porter & Porter 8978 (Se—210173). Roosevelt Co.: J. S. Martin 881 (Se—107337). San Miguel Co.: Ferris 11498 (Se—194234). Socorro Co.: Baad 1348 (Se—236221). Valencia Co.: Baad 1106 (Se—235332). ARIZONA: Apache Co.: Kruckeberg 4609 (Se—208324). MEXICO: Coahuila: Johnston & Muller 186 (Au—301897), 580 (Au—301429), 1125 (Au—300985); Stanford, Retherford, & Northcraft 241 (Au—301094).

VERBENA WRIGHTII f. ALBIFLORA Moldenke

Synonymy: Verbena wrightii albiflora Moldenke ex Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1877. 1970.

Additional bibliography: Moldenke, Phytologia 13: 276. 1966; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1877. 1970; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1317 & 1325. 1970; Moldenke, Fifth Summ. 1: 60 (1971) and 2: 706 & 922. 1971.

VERBENA XUTHA Lehm.

Additional & emended bibliography: A. Wood, Class-book, [ed.

42], pr. 1, 538 (1861), [ed. 42], pr. 2, 538 (1863), [ed. 42], pr. 3, 538 (1865), [ed. 42], pr. 4, 538 (1867), [ed. 42], pr. 5, 538 (1868), [ed. 42], pr. 6, 538 (1869), and [ed. 42], pr. 7, 538. 1870; A. Wood, Am. Bot. & Flor., ed. 1, pr. 1, 236 (1870) and ed. 1, pr. 2, 236. 1871; A. Wood, Class-book, [ed. 42], pr. 8, 538. 1872; A. Wood, Am. Bot. & Flor., ed. 1, pr. 3, 236 (1872), ed. 1, pr. 4, 236 (1873), ed. 1, pr. 5, 236 (1874), and ed. 1, pr. 6, 236. 1875; A. Wood, Class-book, [ed. 42], pr. 9, 538 (1876) and [ed. 42], pr. 10, 538. 1881; O. R. Willis in A. Wood, Am. Bot. & Flor., ed. 2, 236. 1889; Lowe, Miss. State Geol. Surv. Bull. 17: 236. 1921; Lewis & Oliv., Am. Journ. Bot. 48: [639]—641, fig. 24. 1961; Hocking, Excerpt. Bot. A.6: 91 (1963) and A.11: 503. 1967; Rickett, Wild Fls. U. S. 2 (2): 464, [465], & 686, pl. 171. 1967; Hocking, Excerpt. Bot. A.13: 571. 1968; Hocking, Pharm. Abstr. 9 (2): entry 656. 1968; Moldenke, Biol. Abstr. 49: 5713. 1968; Moldenke, Phytologia 16: 215. 1968; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl. 717. 1969; Rickett, Wild Fls. U. S. 3 (2): 365, [367], & 551, pl. 111. 1969; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1877. 1970; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1315 & 1320. 1970; Moldenke, Fifth Summ. 1: 32, 33, 48, 49, 60, 64, & 373 (1971) and 2: 657, 680, 682, 698, 706--708, & 922. 1971; Moldenke, Phytologia 23: 242, 265, & 376. 1972.

Additional & emended illustrations: Rickett, Wild Fls. U. S. 2 (2): [465], pl. 171 (in color) (1971) and 3 (2): [367], pl. 111 (in color). 1969.

Recent collectors refer to this plant as a coarse annual to 12 dm. tall and have found it growing on low coastal prairies and on low marl and gypsum ridges, as well as on riverbanks, sometimes along with scattered Acacia farnesiana. Mears states that it is "not very common in a pasture with a lake" in Harris County, Texas, while Cory reports it "occasional in sandy fields" in Galveston County and "occasional in dense herbaceous vegetation in sand along roadsides" in Jefferson County of the same state. Lowe reports it from "Waste places, especially near the coast" in Harrison, Hinds, and Lafayette Counties, Mississippi. The corolla is described as having been "lavender" on D. S. Correll 35266, C. L. Lundell 11921 & 14135, and Lundell & Lundell 13107. Lewis & Oliver (1961) report the diploid chromosome number as 42 for this species.

Rickett (1969) describes V. xutha as having "bristly-hairy stems 2—4 feet tall. The leaves are generally three-lobed and coarsely toothed, hairy on the under side. The bracts are commonly a bit shorter than the calyx, which is about 1/6 inch long. The corolla is about as long, from deep blue to purple, and up to 1/3 inch across. March to October: in dry sandy soil on beaches, prairies, and roadsides and in fields through eastern, southern, and western Texas, and eastward to Alabama."

The Mears 546, distributed as V. xutha, is actually V. brasiliensis Vell.; Fleetwood 9010, E. G. Marsh 1625, and R. Runyon

2181 are V. halei Small; E. L. Greene s.n. [Pinos Altos Mtns., August 23, 1880] & s.n. [August 1, 1880] and C. H. Mueller 8138 are V. neomexicana (A. Gray) Small; S. S. White 3099 is V. neomexicana var. xylopoda Perry; E. G. Marsh 859 is V. perennis Wooton; R. Runyon 4871 is V. runyoni Moldenke; and B. J. Turner s.n. [Summer 1939-40] is V. stricta Vent.

Additional citations: ARKANSAS: Sevier Co.: Demaree 58093 (Ac). LOUISIANA: East Carroll Par.: Thomas, Thomas, Thomas, & Thomas 3347 (N). Plaquemines Par.: Langlois 612 (Pa). TEXAS: Brazoria Co.: Fleetwood 9360 (Ld). Brazos Co.: H. B. Parks s.n. [June 23, 1946] (Se—119421). Galveston Co.: Cory 51020 (Mi). Harris Co.: Boon 291 (Au—211303); E. Hall 434 (Pa); Joor s.n. [Harrisburg, June 12, 1875] (Pa), s.n. [Aug. 26, 1876] (W—2607109); Lundell & Lundell 13107 (N); Mears 549 (Au—249630). Jefferson Co.: Cory 50962 (Mi), 50968 (Mi); C. L. Lundell 14135 (N). San Jacinto Co.: D. S. Correll 35266 (Ld). Travis Co.: C. L. Lundell 11921 (N).

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BOOK REVIEWS

Alma L. Moldenke

"PROBING PLANT STRUCTURE - A Scanning Electron Microscope Study of Some Anatomical Features in Plants and the Relationship of These Structures to Physiological Processes" by John Troughton & Lesley A. Donaldson, 116 pp., illus., McGraw-Hill Book Co., St. Louis, San Francisco, New York, New York 10036. 1972. $4.95 paper-back.

This beautifully effective picture-book with pertinent legends comes from scientists and equipment of the Department of Scientific and Industrial Research in New Zealand. The 105 large plates show leaf surfaces, stomata, leaf interiors, chloroplasts, xylem, apical meristem, flowers and their parts, fertilization and seed development, and seeds.

"The book concerns some aspects of three basic processes in plants: carbon dioxide uptake [and metabolism of the C_3, C_4, and crassalacean acid types], water transport and reproduction. It is intended that this book should be used to complement existing textbooks but at the same time it will be useful for practical classes in biology where the photographs will assist in the interpretation and understanding of fresh material or slides." Many others could enjoy and profit from this book, too.